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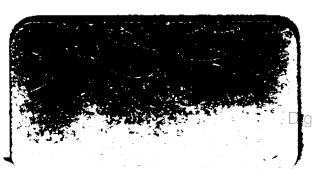

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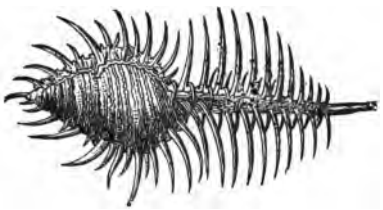

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INTRODUCTION.

THE publishers of THE NAUTILUS feel that no explanation of their object in offering this journal to the scientific public is necessary. The need of an American publication devoted especially to the interests of Conchologists is felt throughout the country. One of the greatest difficulties which the student of science has to overcome is found in the scattered and fragmentary character of scientific literature. The "Proceedings" or "Transactions" of a hundred societies, and the pages of innumerable journals must be searched through before one can be certain that a given fact or observation has or has not been recorded.

The simplest way to better this condition of things will be to limit by some means the number of publications in which a certain subject is likely to be treated upon; and this is most easily done by establishing journals devoted to special branches of science. It is the aim of THE NAUTILUS to afford such a medium for all who are interested in studying the Mollusca; and to this end the co-operation of all friends of science is solicited.

All subscribers to the *Conchologists' Exchange* (of which this paper is the successor) will be credited on the books of THE NAUTILUS with the amounts due them upon the suspension of that journal. All subscribers will be allowed one insertion of twenty-five words in the Exchange Column, free of charge.

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NOTES ON THE SOFT PARTS OF TROCHUS INFUNDIBULUM WATSON

With an account of a remarkable Sexual Modification of the Epipodium, hitherto undescribed in Mollusca.

BY WM. H. DALL, CURATOR DEPT. OF MOLLUSKS, U. S. NAT. MUSEUM.

The presence of a verge, or intromittent male organ, has hitherto, among the Rhiphidoglossate Mollusks, been recorded only in *Neritina* (Claparédè) and certain Limpets. The organ as it exists in *Neritina* and *Nerita*, is so short and obscure that its function and even its existence has been called in question. When I showed its existence in the rather anomalous *Addisonia paradoxa* and *Cocculina spinigera*, curious deep-sea limpets, it was questioned whether they were not peculiarly modified *Tœnioglossa*.

Since then, in several deep-sea Mollusks, such as *Rimula*, *Margarita* and others indisputably belonging to the *Rhiphidoglossa*, I have found a well-developed verge; and there is little doubt that the ancestors of this group, as well as of the *Tœnioglossa*, were so provided, and that some of these deep-sea forms have retained the organ now generally obsolete in their shallow water congeners. In combination with this survival, one of the species, *Trochus infundibulum* Watson, offers a singular and very interesting special modification of the anterior portion of the epipodium on the right side, which appears worthy of particular attention.

The soft parts of this species afford several notes of interest. The external parts, except the eyes, are white. The foot is wide, straight and double-edged in front, and, as far as one can judge from specimens contracted in alcohol, must have been somewhat pointed or produced at its anterior corners in life. The sides of the foot are nearly smooth, below the epipodial line.

The muzzle is small and slender at its proximal end, enlarged and transversely semi-lunar at its distal extremity. The oral surface of the muzzle is smooth, the mouth very small; the oral disk is flat and produced on each side into a thin linguiform lappet, with simple and entire edge. These lappets are remarkably long, their ends reaching as far as the ends of the true tentacles, and serve as tactile organs, like the oral tentacles of the *Lepetidæ*, or the much smaller lappets of *Acmæa*. When not feeding, or seeking food, these lappets would seem to be applied to the sides of the foot below the epipodium.

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The oral disk is entire, but is slightly indented in the median line below a furrow running up toward the mouth.

The cephalic tentacles are very stout and large, very elongate-conical, with moderately pointed tips. They are situated above, and not, as in most *Trochidæ*, on each side of the muzzle. Their inner bases are connate, and there is no intertentacular "veil," or any tubercular traces thereof.

The eyes are large, strongly pigmented, ovoid, and sessile on the outer bases of the tentacles, or perhaps I should say, just by the outer bases. They are not pedunculate or elevated on pedicels in any of the specimens examined, and I am quite confident that this is not caused by the contraction due to alcohol, but is normal to the species.

The epipodial apparatus is complicated, and exhibits a certain amount of variation between different individuals in the situation and number of its processes. In the males, it is subjected to a remarkable modification for sexual purposes. The epipodium begins immediately behind the eye and a trifle below it. In the females it is produced into a large broadly linguiform process, half as long as the cephalic tentacles and fringed with close-set uniform small pointed papillæ or filaments. This process exists in the male on the left side. The posterior margin then curves in toward the side of the foot; it becomes quite narrow and shows two lateral tentacles of moderate size; then a vacant space; then at the front edge of the operculum two or three filaments, small, but larger than any in the vacant space; then another, but larger one; and finally another, which is behind the middle of the operculum, and is the last on that side. The epipodial line is continued to the end of the foot, the dorsal surface above it, being transversely rugose and with a linear median furrow. On the other (right) side we find a small, a large, two subequal small, another large filament, followed by a slight gap and then by a still larger tentacular process. The flap which corresponds to the fringed process on the left side, is remarkably modified in the male.

Behind, and close to the right eye, is a small tubular, longitudinally striate, cylindrical verge, not exceeding (in alcohol) two millimetres in length. Below it the epipodial flap is enormously produced, and its front edge is rolled backward upon itself, forming a tube into the proximal opening of which the end of the verge may project. The flap is rolled so that it makes nearly two layers, and thus a very capable cylinder, which, when unrolled and released,

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will immediately coil itself up again. This cylinder is of subequal diameter throughout, and is as long as, and somewhat stouter than, the cephalic tentacles. Externally, near its base, it is nearly smooth; further out, it is spirally striate; near its extremity, it becomes thicker and rather deeply externally grooved longitudinally, with short, even, close-set, slightly spiral, grooves. The opening at the distal end is fringed with short, equal papillæ, each one corresponding to the thickened interspace between two of the grooves. These raised folds, or interspaces, are also finely transversely striate. At the base of the cylinder, the epipodium extends backward to the first lateral filament; and the margin of this part is perfectly entire and simple, showing neither fringe nor granulation. The object of this apparatus is self-evident. The cylinder serves as *a conduit for the seminal fluid ejected from the verge.* Whether it may be employed in an actual copulation is doubtful; it may merely serve to spread the seminal matter over the eggs as they are deposited by the female. I am not aware that anything of this sort has been observed in any other gastropod, up to the present time.

The edge of the mantle is smooth, entire, and slightly thickened. Within the nuchal chamber the anus is visible on the right side. The end of the intestine, for a considerable distance, is free from the mantle and projects like a tentacle. The termination is slightly constricted, then enlarged into a cup, or trumpet-shaped ending, which nearly reaches the mantle-edge.

The intestine itself, after leaving the stomach, is much convoluted, but in the main, rises and is brought forward nearly to the mantle-edge above the stomach; then turns back and is carried far into the visceral coil before it is again brought forward and terminated as above described. The food consists of Foraminifera.

The gill is free, except at its base, and consists of very elongate-triangular foundation, from which depend triangular lamellæ, without a raphe and wide at their bases. These grow larger proximally.

The operculum is thin, polished, amber-colored, centrally depressed, having a central projection, or nipple, on its under-side, and consists of about four whorls.

. The specimen affording the above notes has been identified with Mr. Watson's type specimen, and is now deposited with it in the British Museum. It was dredged by the U. S. Fish Commission east of Chesapeake Bay, in 1685 fathoms.

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CAST UP BY THE SEA.

BY E. W. ROPER, REVERE, MASS.

While cleaning up the trophies of a recent successful trip to the beach, I wondered if my fellow shell collectors, who live near the seashore, appreciate the need of closely following up the storms. It is not enough to go occasionally. The beach ought to be searched every time a strong on-shore wind brings in a heavy surf. And the visit ought to be made at the first low tide. Another flood tide with change of wind may bury the most precious treasures under the sand. I may go nineteen times to the three-mile beach near my home, and get nothing new, although I should never come home empty handed; but on the twentieth visit a shell is found of a species I have not before collected. Once it was a little red *Margarita undulata;* and again a *Bela harpularia.* Only the enthusiastic collector knows the peculiar pleasure of such discoveries, and only the collector experiences a pang at the sight of some rare shell hopelessly broken, as I have many times seen the fragile *Thracia conradi.* The latter and other bivalves live beyond low-water mark, very likely so deep in the sand that a dredge would pass over them. But in a heavy easterly gale the great breakers, pounding on the outer bar at low tide, plow up their home, and rolling over and over, the helpless shells are brought to shore by the incoming tide. It is noticeable that seldom do two storms bring in a similar class of shells.

I remember one gale which literally strewed the beach with tens of thousands of the "little amethystine gems" which Totten called *Venus gemma.* Another time the razor shells and the pretty *Machæra costata* will suffer, and again the prevailing species will be *Lunatia, Buccinum* and *Fusus.* Eight times, in as many years, I have found the large *Solemya borealis,* twice alive. The little *S. velum* is more common. Once I captured a living *Pecten tenuicostatus* of large size. How violently he opened and shut his shell when placed in a shallow pan of fresh water! But in spite of assiduous collecting I can note less than seventy marine shells found in Revere. Doubtless collectors on more southern shores can find a greater variety.

GENUS MAKING.

BY CHAS. T. SIMPSON, TAGGART, MO.

Genus making is the fashion now-a-days with a certain school of conchologists. Parties addicted to this work have access to good

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libraries and an extensive collection of shells, and their whole aim in life seems to be making new genera. In some one of the older groups a few species are found, having a certain peculiar pattern of sculpture or coloring, or some little singularity in the fold of the columella or hinge teeth, and presto, a genus is formed and the science is burdened with another name!

These genus-makers never stop to see whether this slight peculiarity does not imperceptibly shade out into other species which are not as marked; this is no business of theirs; the main point seems to be the attaining of a sort of cheap reputation for scientific knowledge.

According to Tryon's Structural and Systematic Conchology, there were, at the time of its publication in round numbers, about 6,000 of these so-called genera, besides a great many synonyms, a number which has been largely increased since that date. Even the old genus Helix, without Nanina and Zonites, has some 200 of these names, many of which have never been characterized. No doubt our increasing knowledge and the good of the science has demanded that some of these older genera should be divided. In days gone by the name Pyrula embraced a large proportion of the marine univalve shells, having a short spire and lengthened canal, while Fusus included about all with a similar canal and elevated spire. So Buccinum was a miscellaneous group, characterized principally by a notch at the base of the aperture. As now generally recognized, Pyrula includes only pear-shaped shells of thin papyraceous structure, Fusus a sort of spindle-shaped species, and Buccinum a small, well-defined, perfectly natural group.

I am aware that those who favor this dismemberment of the older genera claim that many of these groups are too large for studying advantageously, and that the variation from the type of a genus is very gradual through long series of species, to forms which are so different from the type that no description will cover the whole, and the very ambiguous description of Helix is quoted as an example of this. Mr. Binney, in the Manual of American Land Shells, says: "In common with all who have studied the Pfeifferian genus *Helix*, I have long been convinced of the necessity of recognizing among its species numerous distinct genera. * * * Before recognizing these groups as distinct genera, I desire to wait until we can ascertain whether generic characters can be found in the jaws and lingual dentition, as well as in the shells. Convinced that characters cannot be found in these organs, or in the genitalia, I adopted, in that work,

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(Terr. Moll., U. S.) the dismemberment of the genus so much demanded by the number of its species, founding the distinction on the shell alone."

It was as if the court had made up its mind beforehand, but had waited for the evidence to establish the decision, and when the evidence did not support it, the decree was rendered just as the court had intended all along. Many of these so-called genera of Helix have no value at all, and others so little as to be almost worthless for purposes of classification. Our well-known Mesodon runs into Triodopsis, and Arionta and Aglaia cannot always be separated. Tryon at one time placed Helix devius, Gould, in the genus Mesodon, and at another time he, as well as Mr. W. G. Binney, called it a Triodopsis. Tryon put Arionta townsendiana, Lea, in the genus Mesodon, and Mr. Binney regards Aglaia hillebrandi, Newc., as a varietal form of Arionta mormonum. And I might give such illustrations to the end of the chapter, all of which go to show that even among the savants these so-called genera are well nigh valueless.

But let us suppose that in any of the larger genera there is a chain of species varying from the type to those which are very unlike it; that the variation is very gradual throughout the species. I cannot see that dividing such a genus into a dozen, a hundred, or a thousand genera is going to help the matter or give us any clearer insight into the relationship of the species. I think that the classification should be founded on nature, or in other words, that nature should do the classifying, and that our efforts should be directed to deciphering the Old Dame's work. And if a distinction does not exist between certain so-called species and genera, it is useless to put it there, as it will simply require that somebody in the future, when the truth is reached, will have to throw it out.

The genus Unio, with its thousand species and endless variations, has been divided into a number of sub-genera by the genus makers; but a Unio is a Unio for all that, and the merest novice in conchology would recognize it as such in a moment; while probably not one conchologist in a hundred could tell a Bariosta, Raf., from a Hyridella, Swains. Dr. Isaac Lea showed his great knowledge of this subject when he grouped them into mere divisions founded on form and sculpture.

I think the time has come when a healthful reaction from this fever of creating genera and species should set in. Such work simply renders the science of conchology contemptible, and it is a veritable

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stumbling block to the ranks of the beginners. To these the science should be rendered as simple and attractive as possible, and they should rather be encouraged than discouraged by a formidable array of names without meaning. No one but an expert, a closet naturalist, who sits in his snug alcove, surrounded by scientific books and collections, and who devotes his entire time to the study, can keep track of the names introduced by this mania, and I doubt if many of these can do it.

The old landmarks of the noble science are going one by one, and we should seek to fill the ranks from the young and enthusiastic, from those who have a living to make, and cannot devote their whole time to puzzling over a lot of names that even their authors did not comprehend, and only inflicted upon the world for the sake of gaining notoriety.

STRIÆ.

Paludina scalaris, Jay. Apropos of Mr. Pilsbry's interesting note on this species, I would call attention to the fact, which does not seem to be well understood, that *Ameria* has been shown *in toto* to belong not to the *Physidæ*, where it was originally placed, but to the *Limnaeidæ*. As there are rounded and carinate *Planorbis*, so there are rounded and carinate *Ameria*. Whether *Ameria* is more or less than a section of *Planorbis* is a question, but it seems to me that the high form of the shells is at least as well worthy of recognition by a name as *Gyraulus*, *Helisoma*, and other forms commonly so recognized. Whether *A. scalaris* belongs to the Limnæinæ or the *Planorbinæ* should be easy of determination since the form of the tentacles would serve to decide this at a glance. Wm. H. Dall, Smithsonian Institution, Washington, D. C.

Patula cooperi, in Colorado and Utah. This interesting species is extremely common in parts of Colorada, and also, it would appear, in the Wahsatch Mountains of Utah, where it is accompanied by four others of the same group. It is decidedly variable and for reference it may be useful to class the principal varieties as follows: a. *typica*, the ordinary form in Colorado, with two distinct bands, diameter 19 to 25 mill.; b. *elevata*, spire elevated, Utah (Hemphill) and Colorado, a specimen found by Surface Creek, Delta Co., had alt., 12½, and diam. 16 mill; c. *minor*, very small, Utah (Hemphill); d. *confluens*, bands confluent, shell therefore brown with a broad white band above the periphery and a white umbilical region, Col-

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orado, by the Grand River, in Garfield Co., and by Plateau Creek, in Mesa Co.; e. *trifasciata*, with three bands, one above the periphery and two below, all distinct, the area between the first band and the suture marbled with brown, Mam Mountains, Mesa Co., Colorado; f. *alba*, white with rough striæ, Utah (Hemphill). Hemphill also mentions a white variety of *Patula strigosa*, Gld., from Utah, which may be called var. *alba*.

I have recently found *Cochlicopa lubrica* and *Hyalina radiatula* near here. Also *Limnæa truncatula* and two species of small *Pupæ*, which may be new. Theo. D. A. Cockerell, West Cliff, Col.

On the occurrence of *Limosina* in Texas. According to Prime, the species of this group are "widely and abundantly distributed through Central and South America and the West Indies," to the exclusion of the equally abundant species of *Sphærium* peculiar to the United States. Several years ago Mr. G. C. Heron sent me three specimens of a *Sphærium* from Cedar Creek, Hudson Co., Texas, whose unusual shape and mottled epidermis at once struck me as peculiar. On sending one of the specimens directly to Mr. H. A. Pilsbry, of the Philadelphia Academy of Natural Sciences, for identification, I was informed that he could not satisfactorily identify it with any known species, but that it was nearer to *L. cubense* Prime, than to anything else, although for the present the specific identity of the specimen must remain uncertain. The occurrence of this group, hitherto unknown to our fauna within the United States, would seem to be a fact worthy of record. Bryant Walker, Detroit, Mich.

H. (*Fruticicola*) *similaris*, Fer., *Triodopsis appressa*, Say, *Stenogyra decollata*, L., in Bermuda. All three have been probably introduced in the past 25 years. During a recent visit, I found the first mentioned near the Government house in Hamilton. The second species was shown me by Miss A. M. Peniston, of The Flatts, who secured it from Mr. Bartram. It occurs near St. Georges. The last species is so common it threatens to become injurious to the crops there. It was introduced with some European plants, and first made its appearance at Mt. Longdon. *Stenogyra octona* Chem., is also found upon the island, and is not mentioned by Bland. T. H. Aldrich, Southern Ave., Cincinnati, Ohio.

In the *Western American Scientist* for April, p. 8, Mr. Berlin H. Wright has described as new, under the name of *Bulimulus hemphilli*, the species figured by Binney (Manual N. A. Land Shells, fig. 440) as a variety of *B. floridanus*. The form in question should be compared with *B. marielinus* Poey.

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NOTES ON THE GENUS CYPRÆA.

BY JOHN H. CAMPBELL.

Since the publication of the latest monograph on the genus Cypræa—that by Mr. Roberts in Tryon's Manual of Conchology—four new species have been described, viz:—

Cypræa amphithales Melvill, South Africa.
Cypræa caput-draconis Melvill, Hong-Kong.
Cypræa Hungerfordii Sowerby, Hong-Kong.
Cypræa Rashleighana Melvill, hab. unknown.

Each of them has been described, apparently, from a single specimen, and it is not at all certain but that two of Mr. Melvill's species, *amphithales* and *caput-draconis* may turn out to be mere varieties.

In Mr. Melvill's "Survey of the genus Cypræa," reprinted in pamphlet form in Manchester, England, last year, a large number of new varieties of known species are described—some of them founded upon mere color variations. Most of them seem to me unnecessary additions to shell nomenclature. Tryon and Roberts recognized 146 species of Cypræa proper and 40 species of Trivia—making 186 species in the genus. Mr. Melvill, in his survey, differs with them upon some points. He changes *C. princeps, Gray,* to *C. valentia, Perry; C. undata, Lam.,* to *C. diluculum, Reeve;* and *C. turdus, Lam.,* to *C. ovata, Perry;* reduces from specific to varietal rank, *C. reticulata, Martyn; C. coxi, Brazier; C. polita Roberts; C. semiplota, Mighels; C. cernica, Sowerby; C. coxeni, Cox; C. sophiæ, Brazier; C. microdon, Gray; C. macula, Adams;* and *C. fuscomaculata, Pease;* and advances to specific rank the following varieties: *C. caput-anguis, Phil.; C. fabula, Kiener; C. coffea, Sowerby; C. menkeana, Deshayes; C. brevidentata, Sowerby; C. bregeriana, Crosse; C. comptoni, Gray; C. depauperata, Sowerby;* and *C. scabriuscula, Gray.*

I have lately received a fine specimen of *C. bregeriana, Crosse, New Caledonia,* from Mr. G. B. Sowerby, of London, who writes to me that he is now of the opinion that it is a good species and not a variety of *C. walkeri, Gray,* as he thought it to be when he published his monograph in the Thesaurus. Mr. Roberts also make it a variety of C. walkeri. Weinkauff and Melvill give it specific rank, as does also Mr. Richard C. Rossiter, of New Caledonia. I think it is, undoubtedly, a good species. The white specks are characteristic and are not found in *C. walkeri.*

A large series of specimens of *C. cervus Linn.* and *C. exanthema Linn.,* which I have in my collection, leads me to doubt whether these two species are really distinct. No authentic localities outside of Panama and vicinity, West Indies, Florida and Southeastern United States are known in connection with either of them, and they are found indiscriminately in the localities named. A beautiful set of specimens of *C. cervus,* from the South Florida Keys, are in the Academy of Natural Sciences of Philadelphia. I have spec-

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imens of both species from several localities in the West Indies, and the characters described in the books do not hold good to separate them. It is a pity that some naturalist has not examined the animals.

It is also doubtful if *C. exusta Sowerby*, and *C. talpa, Linn*, are distinct. I have a specimen of the typical *C. exusta* from Mr. Sowerby, and another which I received from Mr. Damon, of Weymouth, England, seems to me to connect the two species. Weinkauff may be right in making *C. exusta* a variety of *C. talpa*.

The opinion held by some that *C. decipiens Smith*, was a dwarf variety of *C. thersites Gaskoin*, has been definitely set at rest by Mr. Sowerby receiving last summer, a number of fine specimens of *C. decipiens* from Australia. I was fortunate enough to obtain one of them—probably the first specimen that has reached America. It is certainly a good species, and one of the most beautiful of all the Cypræas. The palm of beauty probably lies between it and *C. aurantium Martyn*. By the way, the fabulous prices given for the last-named shell are things of the past. Instead of costing anywhere from $50 to $100, a good specimen can be obtained for $15, and the finest kind of one for $20 to $22. It is no longer a rare species, but can readily be obtained from any of the prominent shell-dealers of Europe.

Philadelphia, April 10, 1889.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

Chapter XLV.

SUB-ORDER INTEGRIPALLIATA.

Siphons short, not retractile; pallial impression simple, without sinus. This sub-order, contains fifteen families.

FAMILY CYRENIDÆ.

Shell regular, oval or sub-trigonal, covered with an epidermis; hinge with two or three teeth in each valve; lateral teeth, two, simple or striated; ligament external; pallial impression simple, or with a short sinus.

This family has been made the special study of Mr. Temple Prime, a lawyer of N. Y. City, who is authority on this subject. He published, in 1865, a monograph of the species inhabiting the American Continent, illustrated with figures and giving all the synonyms, localities and other items of interest concerning them. In 1871 he published a catalogue of all the species in the world (of this family), known to date. He divided it into six genera and three hundred and twenty-two species, of which one hundred and eleven are American. There are now recognized seven genera and nearly four hun-

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dred species. Four genera are represented in America, three in the U. S., and two in New England.

Genus *Sphærium*, Scopoli.

The genus Sphærium was characterized under its present name by Scopoli in 1777. It has borne some fourteen different names, but has been better known to conchologists, especially in Europe, by the name of Cyclas, given by Bruguiére in 1792. Gray revived the name of Sphærium in 1847, and Mr. Prime was the first in America to recognize its claims. There are seventy-five species distributed world-wide; they are found in rivers, ponds, lakes and ditches, in fact, in all bodies of fresh water, but are more abundant in species and in individuals in the northern parts of our country than in any other section of the world. Four species inhabit Rhode Island, and possibly more.

170.—*Sphærium partumeium* Say.

I shall not attempt to give the synonymy of this, or any of the species of this genus, or of the next to follow; it would be a wearisome and a thankless task; these shells are so little known, and the animals inhabiting them have been so little studied that the synonymy is but an entangled mass of errors. For the benefit of those who might desire to study deeper into the subject, and to post themselves in regard to the views of authors who have written upon it, I would refer them to Prime's "Monograph of American Corbiculidæ," published by the Smithsonian Institution, at Washington, D. C., 1865.

Sphærium partumeium was first described by Say in Journ. Acad. Nat. Sci., Philadelphia, ii, 380, 1822, under the name of Cyclas partumeia. It is distributed all over the U. S., east of the Rocky Mountains, and its habitat is in stagnant pools and muddy ponds. The animal is of a delicate pink, and the syphonal tubes of the same color. The shell is rounded-oval, thin, fragile and pellucid; nearly equilateral; beaks central, calyculate approximate at the apex; epidermis glossy, light greenish or bluish in color; interior of valves light blue; hinge margin nearly straight, curving gradually into the anterior margin, but curving behind, so as to form an obtuse angle, causing the posterior side to appear broader; cardinal teeth strong; lateral teeth much elongated. The young shells are more compressed than the adult, and are of a light yellow color. Length of shell, 9-20, height, 2-5, breadth, 4-15 of an inch.

(*To be continued.*)

NUMEROUS publications received will be noticed in our next number.

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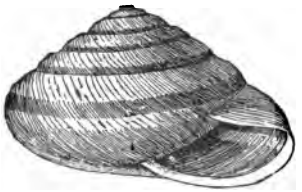

Helix (*Aglaia*) *fidelis* Gray, Oregon.

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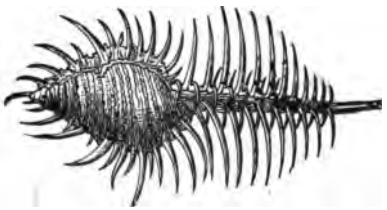

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NOTES ON LOPHOCARDIUM FISCHER.

BY W. H. DALL.

Any one who has been interested in the *Cardiacea* will remember the beautiful shell described by Adams and Reeve in the Mollusca of the voyage of the "Samarang," under the name of *Cardium Cumingi*. This lovely shell is elongated, inflated, rose-red, anteriorly nearly smooth and posteriorly moderately sculptured. As described and figured the most remarkable feature is that the vertical ridge, which in all *Cardiacea* separates the generally diverse sculpture of the posterior area from the rest of the surface, is remarkably high and elevated while the rest of the sculpture is faint. No other species has so prominent a ridge, but nearly all species have a ridge of some sort. On this account Dr. Fischer in his recent Manual (p. 1038, 1887) proposed for this shell the sectional name of *Lophocardium*, in the subgenus *Papyridea* Swainson.

On the voyage of the U. S. Fish Commission steamer *Albatross* to California, another species of *Lophocardium* was dredged in 25 fathoms off the coast of Lower California, near Cerros Island. This shell is 30.0 mm. long and 25.5 mm. high with a maximum diameter of 12 mm. It gapes behind as in *Fulvia*, is of a delicate salmon-pink, with a thin brownish epidermis. The posterior area is reticulated, the somewhat irregular concentric lamellæ being sparser and higher than the radii, and with the epidermis produced on their edges. The radial bounding ridge is notched and much less prominent than in *C. Cumingi*, in fact is not more elevated than in many other *Cardiacea*, and is fringed with epidermis. The area in front

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of it comprises more than five-sixths of the whole surface of the valve and is finely obscurely reticulated by flat, little elevated, broad radii and faint concentric waves; much as in *Cardium peramabilis*. The epidermis rises in thin distant irregular concentric lamellæ.

The most surprising feature of the shell—which, as far as I have been able to discover, is not paralleled in any other species, recent or fossil—is the total absence of lateral teeth. They are not obsolete or obscure, there is simply no trace of them; while the cardinal teeth are well developed and even rather long, and of the normal character. In the right valve the cardinal margin extends backward as a narrow angle or ridge; not elevated, but narrow like the mark on a piece of paper which has been opened after being folded. In front, on the same valve, there is nothing of this; nor on either side of the hinge in the other valve.

On writing to Mr. E. A. Smith of the British Museum, he kindly examined the original (and still unique) type of *C. Cumingi* and reported that it has a hinge identical with our new species.

It is very extraordinary that neither Adams nor Reeve should have noticed this, and no one since has observed it.

The new form which will be called *C.* (*Lophocardium*) *Annettæ*, will be more fully described and figured in the "Report on the *Albatross* Voyage," now in preparation.

It contained the soft parts which resemble those of other Cardiums except that the siphonal septum is remarkably prolonged forward, to and around the foot thus separating the mantle-cavity below the visceral mass, into an anal and a branchial chamber. The septum is membranous, thin, and only perforated for the passage of the foot. The gills are large and normal.

It is evident therefore that the section *Lophocardium* will take subgeneric rank in the genus *Cardium*, and be characterized by the absence of lateral teeth, the prolonged siphonal septum, and the prominent radial lamina. Both the species now known are from the west coast of subtropical America, and each represented by a single perfect specimen.

A NEW CALIFORNIAN HELIX.

BY H. A. PILSBRY.

H. (TRIODOPSIS) ROPERI Pilsbry.

Shell broadly umbilicated, flattened, subdiscoidal, resembling in

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general form *H. harfordiana* Cooper and *H. polygyrella* Binn. & Bld.; rather thin, opaque, lusterless, reddish-chestnut colored; surface delicately obliquely striate above, smoother beneath, all over beset with short delicate hairs. Spire scarcely perceptibly convex, flat; sutures moderately impressed; apex light-colored; whorls 5½, convex, very slowly widening, the last wider, rounded on the periphery and below; slightly, rather abruptly deflexed at the aperture, constricted immediately behind the peristome. Aperture oblique, lunate-trilobate; peristome well expanded, thickened within, brownish, outer margin bearing a square tubercular tooth within, basal margin bearing a small tubercle near its union with the outer margin; parietal wall with a long slightly curved transverse lamella, its upper termination opposite the superior lip tooth. Umbilicus broad and deep. Alt. 3, diam. maj. 8, min. 7 mill.

Redding, Cal., at the head of the Sacramento Valley.

Three specimens of this species were found in river drift by Mr. E. W. ROPER of Revere, Mass. The shell seems to be intermediate between *H.* (*Triodopsis*) *loricata* Gld. and *H.* (*Polygyrella*) *harfordiana* J. G. Cooper. It differs from the former in being flatter, much more broadly umbilicated, with different spire and notably different surface sculpture. As to *H. harfordiana* Cooper there seems to be a great deal of confusion in the books; Binney having confounded it with a wholly different species from Idaho. It was described and figured in Am. Journ. Conch. v, p. 196, pl. 17, fig. 8. Binney's figure 81, in Manual Am. Land Sh., p. 114, is supposed to represent the type specimen, but is in several respects very incorrect. His description does not belong to this species at all. The form, in fact, belongs with *H. polygyrella*, differing from that species in the more entering, less triangular parietal tooth, absence of internal rows of denticles, and presence of small lip-teeth. It is very similar to *H. polygyrella* in form, texture, shape of aperture, and the peristome, which is not at all reflected or expanded, but is obtuse, thickened within; in this respect differing from both *Triodopsis* and *Polygyra*, which have expanded peristomes. Only two specimens of *Polygyrella harfordiana* have been found. *H. harfordiana* Cooper must not be confounded with *H.* (*Triodopsis*) *harfordiana* W. G. B.; this name being preoccupied, Mr. Tryon very properly changed it to *H. salmonensis*.

Academy of Sciences, Apr. 29.

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ON THE OCCURRENCE OF UNIO COMPLANATUS SOL., IN MICHIGAN.

BY BRYANT WALKER, DETROIT, MICH.

The first catalogue of Michigan shells was published by Dr. Abram Sager, in 1839. The second by Dr. Manly Miles appeared in the "Report of the Geological Survey" for 1860. In each of these lists Unio complanatus Sol., is cited as a resident of the State, but in neither is any information given as to the exact locality where the species had been, or could be, found. In the several catalogues which have been compiled since that time, no reference is made to the species; and it seems to have been entirely unknown to recent collectors, as an inhabitant of the State.

Such was the condition of things when I gathered together the materials for my Catalogue of Michigan Shells, published in 1879 in the *Journal of Conchology* (Vol. ii, p. 325). That the species was really to be found within our limits seemed, in view of what was known of its distribution, very doubtful. It is peculiarly an eastern species. Exceedingly abundant in all streams flowing into the Atlantic, from Florida to Maine, like its associated species Goniobasis virginica Gm., its range westward was known to be very limited. It had not been found at all in waters tributary to the Mississippi, nor in any of the States bordering on the great lakes (excluding Sager & Miles' citation) west of New York. There was no record of its occurrence in any of the great lakes themselves, nor in their connecting rivers west of the Niagara river. It did not appear to be among the species found by Dr. Gould on the north shore of Lake Superior.

In view of all these facts I felt justified in doubting the identification of the specimens referred to this species by Sager and Miles, especially as G. virginica Gm. also appeared in their lists, and with entire confidence expressed the opinion that the citation was "evidently a mistake."

Since that time, however, the researches of the Canadian naturalists have shown that the species has a wide range through British America, extending as far west as Manitoba. But until within the last year, no evidence had been received tending to show a similar range through the States south of the great lakes.

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In the summer of 1888, Dr. M. L. Leach of Traverse City, Michigan, while exploring Ocqueoc Lake in Presque Isle County, Michigan, found a Unio in abundance, which proves to be U. complanatus. His account of this "find" is as follows:

"In a nameless brook that drains a small lake into the Ocqueoc from the north, I found great numbers of the Unio referred to. You know I had hopes of finding a 'giant clam shell,' and shell heaps made by some primitive people in the Ocqueoc. I found the heaps, which are only beds of shells, not more than six inches in depth, and seldom more than two or three square yards in area, scattered irregularly about over a few square rods of ground. They are on dry land a few rods from the brook, are very old, and are evidently the refuse from the camps of some primitive people who ate the clams. I could find in them only the one species of Unio, now existing in the brook. Smaller collections of refuse shells are seen at other points on the banks of the lake, but all consisting exclusively of this one Unio. So much for a sensational newspaper story."

These facts show that the colony of U. complanatus thus discovered is one of ancient origin, though apparently of limited extent. How it came to be there is a very interesting question. The very considerable labors of our collectors in other parts of the State, especially through the southern and western portions, have failed to discover the species elsewhere. The existence of this isolated colony, far from any other known locality where it is found, is one of those peculiar facts of distribution which arrest the attention, and challenge investigation. It may be considered practically assured that the species does not occur in the southern portion of the State which has been most thoroughly worked over. Should future explorations find the species inhabiting the streams of the upper peninsula and the more northern counties of the lower peninsula the explanation would be obvious. But until that is known, all is conjecture, except the fact that the species does inhabit the Ocqueoc and its tributaries and is entitled to admission to the fauna of Michigan.

DESCRIPTION OF HELIX (TRACHIA) DENTONI N. SP.

BY JOHN FORD, PHILADELPHIA.

Shell small, depressed, umbilicate, rather thin, shining; color corneous-brown, encircled above the periphery by a faint brown

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zone. Surface under a lens presenting a roughish appearance, caused by granules elongated in the direction of lines of growth. Spire depressed, slightly convex; apex obtuse. Whorls 4, gradually widening, the last depressed; deeply and abruptly descending to the aperture, rounded at the periphery, very strongly constricted behind the peristome. Aperture very oblique, nearly circular; lip narrowly expanded, flattened, white, upper and lower margins continuous across the parietal wall, the basal margin slightly thickened within. Umbilicus deep, rather narrow.

Height 3, diam. 7 mill.

Habitat New Guinea.

This species is allied to H. tuckeri Pfr., but may readily be distinguished from that species by the continuous peristome, more oblique aperture and deeper constriction of the whorl behind the lip.

The type specimen was received from Mr. GEO. W. DEAN, of Kent, Ohio, to whom it was presented by the sons of WM. DENTON, a devoted naturalist who lost his life while pursuing his researches in the interior of New Guinea.

NOTE ON THE DISTRIBUTION OF HELICINA OCCULTA.

BY CHARLES R. KEYES.

This operculate land shell was first described in 1831, by Say, from fossil specimens; and it has been only quite recently that living examples have been found. The species is a characteristic fossil of the loess (post-pleiocene) of the Upper Mississippi Valley; and is widely distributed over this region. It is found abundantly in the post-pleiocene deposits of central and eastern Iowa and portions of Illinois, while it occurs less plentifully in similar depositions along the Missouri river. Like the large majority of loess fossils of the region this form is strikingly depauperate, evidencing, as first pointed out by Megee and Call,* a great diminution of vitality, doubtless due, in great part at least, to a much lower temperature than at present. All the shells from the loess present a peculiar chalky whiteness which renders them easily distinguished from "dead" shells of the same species still living. More than thirty species of land and fresh-water mollusca are now known from this deposit in Iowa; and

* American Jour. Sci., Vol. xxiv, Sept., 1882.

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although the greater portion of these forms continue to flourish throughout the region, some have become extinct within the limits of the State, and occur living only in distant localities; while several others are known only as fossils. To the last class, *Helicina occulta* Say, was, until very recently, thought to belong.

The first discovery of *Helicina occulta* living, was a few years ago, in the vicinity of Iowa City, where it was found in great abundance. Its distribution is very peculiar and very limited in extent. The locality is a steep hill-side on the south bank of Turkey Creek, four miles north of the town; and is covered with a dense growth of ferns and other plants. Here, confined within an area scarcely forty yards in extent, this little species occurs so abundantly that several hundred have been collected in a very short time. Beyond this secluded spot not a single specimen has been found living in the vicinity.* A similar limited locality in which this species flourishes in great numbers is in Hardin County, Iowa. It is also reported from South Pittsburg, Tennessee. † The form is now recorded from Winona, Minnesota, where it was found by Mr. J. M. Holzinger, who has kindly sent specimens for examination. Its station is in all respects similar to the Iowa City locality. It thus appears very probable that a careful search in favorable situations will disclose the presence of this interesting little gasteropod in numerous places throughout northeastern Iowa and the adjoining parts of contiguous States. The region referred to is topographically well adapted for the occurrence of this species, but its peculiar and strictly-local distribution tends to render its detection extremely difficult.

GENERAL NOTES.

SPHÆRIUM CUBENSE Prime has been found on the shores of Lake Monroe, Florida, very rare.—*Berlin H. Wright.*

BULIMULUS HEMPHILLI Wright is a thinner shell than *B. Marielinus* Poey, and more corpulent, while the revolving bands are *redder, finer,* and *continuous* in the last-named species. The substance of the shell of *B. Marielinus* is white, while that of *B. Hemphilli* is *light-amber* colored.—*Berlin H. Wright.*

LIMAX eaten by Salamanders. In the stomach of a specimen of the abundant little red Salamander *Plethodon erythronotus* (Green)

* Keyes: Annotated Catalogue Mollusca Iowa,—Bull. Essex Institute, Vol. xx.

† Call: Bull. Washburn College, Vol. II, p. 16, 1887.

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Bd., dissected by Mr. Witmer Stone at the Academy of Sciences, numerous *Limax campestris* Binn. were found.—*Pilsbry.*

STROBILA HUBBARDI A. D. Brown, has recently been found by Mr. C. W. Johnson at St. Augustine, Fla.

DISTRIBUTION of *Helicina occulta* Say. To the localities given by Mr. Keyes in his paper on this species, may be added, Lexington, Va., where living specimens are abundant (*Tryon, Amer. Journ. Conch.* 1869, p. 118). There is also the original locality in western Pennsylvania given by Green for his "*H. rubella,*" a synonym of *H. occulta.* The species was first reported from the West by Mr. E. R. Leland, in 1869, who found living examples at Whitefish Bay, a fishing station about five miles north of Milwaukee, Wis. (*loc. cit.*). At Iowa City, Ia., where Prof. B. Shimek and the writer collected the species in 1880, it is eaten by *Selenites concava* Say. Its operculum affords the little Helicina no protection against the sabre-like teeth of the bloody-minded Selenites, which bores an opening through the front of the body-whorl and dines upon Helicina raw on the shell.—*Pilsbry.*

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA—CONCHOLOGICAL SECTION, May 14. John H. Campbell in the chair. Exhibits of series of *Oliva inflata* Lam. etc. made by Mr. John Ford, who spoke at length upon the characters and variations of *Oliva.* Attention was called to the extraordinary variation in coloration in the genus, and a number of the principal varieties commented upon; among them a remarkably thin-shelled form of *O. inflata,* which the speaker proposed to call var. *ovum-ralli.* Mr. Pilsbry spoke of the modes of specialization of the radula in rhipidoglossate mollusks. The marginal teeth undergo but slight changes throughout the group. The reduction in number of the teeth of the median portion of the membrane, consequent upon the increased size of the individual teeth, takes place in the *Trochidæ* by the loss of *outer laterals;* in *Turbinidæ* and *Phasianellinæ* by the degeneration of the *rhachidian* and *inner lateral* teeth. Mr. Eusêlma C. Smith exhibited a selection of *Conus,* and commented upon a number of the rarer forms of the genus, which he had procured. Mr. Campbell discussed the variations of *Cypræa,* mentioning the peculiarities exhibited by the species of New Caledonia and other localities, illustrating his remarks by numerous specimens. Mr. Jos. Willcox spoke of his

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observations on the habits of *Melongena corona* on the Floridan coast. This mollusk is very destructive to oyster beds. It does not bore the shell, but inserts its probosis between the valves. The speaker stated that the Melongena is preyed upon by *Fasciolaria gigantea.*

THE COLORADO BIOLOGICAL ASSOCIATION, Department of Mollusca. The number of recent Mollusca hitherto known to exist in Colorado is 59; we are now able to add three species, bringing the total to 62. (1.) *Pupa* (*Angustula*) *milium* Gould. Rejectamenta of Muddy Creek, Kremmling, Grand Co. An example sent to the U. S. National Museum has been kindly reported on by Mr. R. E. C. Stearns. "The *Pupa* may be regarded as a western (high) elevated-station form of *P. milium*, larger than eastern specimens." (2.) *Sphærium striatinum* Lam. Abundant in the rejectamenta of Muddy Creek, Kremmling, Grand Co. (3.) *Physa gyrina* Say. A single dead shell of elongated form, found in a lake near Squaw Creek, Eagle Co., is referred to a form of this species. *P. gyrina* was to be expected in Colo. although it is generally replaced in this region by *P. heterostropha*, a condition of things opposite to that obtaining in some eastern localities. An *Ancylus* from the rejectamenta of Muddy Creek, Kremmling, Grand Co., a dead shell, is thought by Mr. Stearns to be probably *Ancylus caurinus* Cooper. Should this be confirmed by the discovery of living examples, it is an addition to the State fauna.

Patula cooperi var. *minor* Ckll. is found to occur in great numbers near Egeria, Routt Co., where it is the prevalent form of the species. This variety has not been noticed in Colorado.

A detailed list of the Mollusca of Colorado is in course of preparation, and it is hoped that all those who have any information bearing upon the subject will kindly afford their assistance.

T. D. A. Cockerell, (Secretary.)

West Cliff, Custer Co., Colorado, May 13, 1889.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

171.—*Sphærium rhomboideum* Say.

This elegant little species was described by Say in 1822, under the name of Cyclas rhomboidea, at the same time with the preceding

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species. It has been known to conchologists generally as Cyclas elegans C. B. Adams, but Mr. Prime, after long and careful investigation, finds it to answer every requirement of Say's rhomboidea, and he is now followed by nearly all authorities in calling it by the above name.

S. rhomboideum is a much smaller, though stouter, shell than partumeium; tumid subglobular; beaks not prominent; both ends of the shell truncate, so as to give it a rhomboidal appearance; interior of valves bluish, exterior olive-green and straw-colored margins; hinge strong; cardinal teeth rudimentary, lateral teeth large and strong; surface elegantly marked with concentric ridges. Length, ⅛, height, 7-20, breadth, 11-40 inch.

It inhabits New England and Canada along the northern tier of States to Michigan. It is extremely local in habitat, and up to 1851 was considered a very rare shell. At this time Mr. Whittemore found it quite abundantly near Cambridge, Mass. In the depression near Hammond's Pond, in Pawtucket, where the Planorbis jenksii was discovered, can be seen in Spring millions of rhomboideum, adhering to stems of aquatic plants and on the dead leaves, while under the leaves at the bottom of the pool, in mud, are obtained the largest and most perfect specimens of partumeium I have ever seen.

172.—*Sphœrium securis* Prime.

Shell small, rhomboidal, acutely rounded in front; posterior margin abrupt, forming an obtuse angle with the hinge margin; beaks elevated, large, nearly central; approximate at the apex; valves thin; striæ very delicate, hardly perceptible without a lens; epidermis variable in color, from greenish-horn to brilliant yellow or straw; cardinal teeth very small; lateral teeth elongated. Length, 37-100, height, 31-100, breadth, ¼ inch. Animal pink, with siphons of the same color, causing the shells to appear pinkish while the animal is inclosed within them.

Inhabits the same range of country as rhomboideum. The only locality in Rhode Island that I have seen is just below Pontiac in the Pawtucket River, under stones at the edge of the water. Some years ago I described a shell found in Tyonge Reservoir, under the name of Sphærium deformis, a shell somewhat larger than typical specimens of securis, with a brownish epidermis, and a distorted twist in each valve; every specimen found in this place was deformed precisely alike, but on submitting them to Mr. Prime, he pronounced them to be only a local variety of securis.

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S. securis was described by Temple Prime in the Proc. Bost. Soc. Nat. Hist., x, 160, 1851.

(*To be continued.*)

BRIEF NOTES ON THE LAND AND FRESH-WATER SHELLS OF MERCER COUNTY, ILL.

BY WILLIAM A. MARSH.

97.—*Planorbis lentus? trivolvis var. fallax* Haldeman.

This shell seems to be quite distinct from *P. trivolvis*, and at present I am unable to decide on its case. That eminent conchologist, Dr. James Lewis, identified it as the true *Planorbis lentus* of Say, and until within a few years I have always given it out in exchange with that name. I find a great difference of opinion among our best conchologists relative to this shell, some considering it *trivolvis*, others Mr. Haldeman's var. *fallax*, and others regard it as *lentus* Say, while still others regard it *P. glabratus*. It is our most common Planorbis, and is very abundant in the sloughs and lakes of the Mississippi River. It is often found associated with *trivolvis*, but may easily be distinguished from that shell by its smoother and more shiny surface, finer striæ, darker color, in having the labrum less prominent above, in having one or more turns in its volutions, in being rounded above and below, and in being more depressed.

98.—*Planorbis* (*Helisoma*) *bicarinatus* Say.

Shell pale yellow or brownish, subcarinate above and beneath, translucent, spire sunken, umbilicate, forming a cavity as deep as the base; aperture large and much vaulted above, within reddish-brown; whorls three, wrinkled, and with minute revolving lines. This species has also a very wide distribution, ranging from British America to Kansas. It is found here only in the lakes of the Bay Island, in the river and river sloughs.

99.—*Planorbis* (*Menetus*) *exacutus* Say.

Shell depressed, light horn color, often almost white, with four flattened whorls. Sides obliquely descending to an acute lateral edge below the middle; spire not impressed; aperture transversely triangular, labrum angulated in the middle, arcuated near its inferior tip, the superior termination just including the acute edge of the penultimate whorl. This fine shell is found around the margins of

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our small ponds, adhering to sticks, pieces of boards, bark, leaves, and often may be found clinging to water plants and grass at or near the surface of the water; also found in beds of moss associated with *Planorbis parvus*.

100.—*Planorbis* (*Gyraulus*) *parvus* Say.

Shell small, discoidal, horn color to very dark brown, both sides concave, whorls four, crossed by minute wrinkles, body generally subcarinate on the margin, aperture rounded, lip rounded and sharp, bluish white within. Said to be common throughout all eastern North America. It is common here in ponds, small sloughs and ditches, found clinging or adhering to sticks, bark and moss; almost always associated with Physa gyrina and Planorbis exacutus.

(*To be continued.*)

PUBLICATIONS RECEIVED.

ANNOTATED CATALOGUE OF THE MOLLUSCA OF IOWA, by Chas. R. Keyes. This list contains 151 species ascertained by the author to inhabit Iowa.

MOLLUSCA OF EASTERN IOWA, by Prof. B. Shimek. This list, together with that of Mr. Keyes, contains probably nearly every species of mollusk to be found in Iowa. Mr. Shimek's catalogue enumerates 169 species, nearly all, I believe, collected by the author himself.

CONTRIBUTIONS TO THE MOLLUSCA OF FLORIDA, by Charles T. Simpson. The results of several years of collecting and of careful study of the shells of Florida are given in this list. The author having resided for several years upon the Southwest coast of Florida, and collected in nearly all parts of the State, has accumulated a collection of Floridan species which includes a large number of forms not previously known to inhabit the State.

The following species are described as new: *Pleurotoma* (*Mangilia*) *Simpsoni* Dall, *Tralia* (*Alexia?*) *minuscula* Dall, *Pandora buschiana* Dall, *Natica fordiana* Simpson.

NEW AND LITTLE-KNOWN AMERICAN MOLLUSKS, by Henry A. Pilsbry (from Proc. Acad. Sci. Phila. 1889). In this paper the following species are described as new: *Holospira elizabethæ* (Mexico), *Zonites singleyanus* (Texas), *Pœcilozonites reinianus* var. *goodei* (Bermuda), *Bythinella æquicostata* (Florida), *Amnicola peracuta* (Texas), and *Sphærium singleyi* (Texas). *Microphysa hypolepta* Shutt., *Zonites dallianus* Simpson, *Hydrobia monroensis* Ffld. are re-defined. The genitalia of *Pœcilozonites* are described, etc., etc. All of the species are illustrated.

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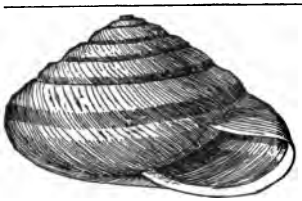

Helix (Aglaia) fidelis Gray, Oregon.

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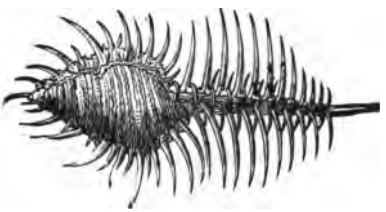

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THE NAUTILUS.

VOL. III. JULY, 1889. No. 3.

NOTE ON TWO HELICES NEW TO THE FAUNA OF THE UNITED STATES.

BY W. H. DALL.

SOME time since, among some shells from Southeastern Florida, received from Mr. G. W. Webster, two small Helices were noticed which a careful comparison with known U. S. forms failed to identify. By the kind intervention of Mr. H. A. Pilsbry, they were determined to be *H.* (*Microconus*) *cæca* Guppy, described from Trinidad, and *H.* (*M.*) *granum* Strebel, previously known from Mexico. This induced me to overhaul the small species in our collection to see if these forms had by any chance crept in under other names. The result was, that I found *H. granum*, which had hurriedly been referred to *Guppyia Gundlachi*, and *H. cæca* which had been left unnamed probably as the young of something else.

The localities now known in Florida for the above species are as follows:

H. cæca. St. Augustine. (C. H. Johnson.) Near St. John's River and near Lake Worth in East Florida, and near the Hillsborough River, emptying into Tampa Bay, West Florida (Mr. G. W. Webster). Mr. Webster identified this species as *H. diosoricola* C. B. Adams, described from Jamaica, and it is very probable that it is at most a slightly larger variety of it, in which case Adams' is the oldest name.

H. granum. Archer, Alachua Co., Fla. (Dall.); Evans' plantation, Rogers River (C. T. Simpson); vicinity of Lake Worth (G. W. Webster). When perfect this species is nearly the size of *H. labyrinthica*, very thin, reddish-brown, with very deep sutures

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and a rather small, deep, tubular umbilicus. It is covered with beautiful oblique epidermal elevated ridges, which are easily lost, and do not agree with the lines of growth. The *H. cæca* is much smaller, olive-greenish, with a silky lustre and few inflated whorls the first of which is usually finely punctate.

The suture is very deep and the umbilicus proportionally larger than in *H. granum.*

ON A SINGULAR CASE OF IMITATION IN OSTREA VIRGINICA.

BY CHAS. T. SIMPSON.

I have before me a shell of Cerithium atratum about $18^{mm.}$ in length, which has attached to it and growing on the side of its spire a young Ostrea virginica about $10^{mm.}$ in length, and $6^{mm.}$ in width. There is nothing at all surprising in the fact that a young oyster should so attach itself to a Cerithium or any other shell, but it is surprising that the oyster should attempt to pass itself off for a part of the shell on which it grew. For, strangely enough, the upper valve of the oyster is sculptured exactly like the surface of the Cerithium. Each revolving ridge and nodule is repeated on the bivalve exactly as it is found on the spire of the shell on which it grows, just as perfect and distinct in every respect; the only difference being that they are not quite so strongly elevated as they are on the Cerithium.

Nor is this all. Not only is the sculpture repeated on the valve of the oyster, but the coloring of the Cerithium is carried over upon it; it being a yellowish-white throughout, covered with brown flecks and spots. When I first examined the shell I supposed that its spire had been injured, and that it had repaired it with an awkward patch; but only after the closest scrutiny did I discover the truth. Two other very small oysters had attached themselves to other parts of the shell, but as their upper valves were missing at the time I first examined it, I could not tell whether they had been similarly marked or not.

It is no uncommon thing for shells which attach themselves to others, to imitate those on which they grow; though I have never seen quite so remarkable a case as this. The shells of Anomia glabra and sometimes Crepidula fornicata, when growing on the Pecten imitate them by being ribbed, and Crepidula plana has often the texture of the interior or exterior of the shells on which it

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grows, and sometimes Crepidula convexa which I found quite abundantly on Modulus floridanus, has the color and something of the corrugation of that shell, so that at first glance it appears to be merely a patch.

What is the object of this singular species of imitation? I believe without exception it is a means of protection against the rapacity of boring molluscs; one of the tricks which nature is constantly exhibiting by which the "survival of the fittest" is attained. The shells of the young oyster on the Cerithium, the Crepidula convexa on the Modulus, the Anomias and Crepidulas on the Pectens, were in every case thinner than those on which they grew, hence more liable to be pierced by carniverous molluscs—but by imitating the shells on which they lived they stood a better chance of deceiving their enemies, a better chance of self-preservation. Does this not look almost like intelligence, almost akin to what we call thought in man —like reason; like studying from cause to effect? and I believe that such variation as this is often perhaps one of the first steps towards the formation of a new variety, a variation which if continued by circumstances fixes certain characters that define a species, and that these characters remain permanently—often after the causes which produced them have passed away.

LIST OF SHELLS OF THE NEW JERSEY COAST SOUTH OF BRIGANTINE ISLAND.

BY JOHN FORD.

ED. NAUTILUS, Dear Sir:

As a list of the species of Mollusks found on the coast of New Jersey, South of Brigantine Island, may be of interest to your readers, I take the liberty of sending it.

If any others can be added it would be a pleasure to hear of them.

Yours truly,

JOHN FORD.

Phila. June 15th, 1889.

Anomia ephippium, Linn.
Arca pexata, Say.
Arca ponderosa, Say. (Fossil.)
Arca transversa, Say

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Astarte castanea, Say.
Crepidula convexa, Say.
Crepidula fornicata, Linn.
Crepidula glauca, Say.
Crepidula plana, Say.
Columbella avara, Say.
Columbella lunata, Say.
Cytherea convexa, Say.
Donax fossor, Say.
Eupleura caudata, Say.
Fissurella alternata, Say.
Fulgur canaliculata, Say.
Fulgur carica, Gmel.
Fulgur perversum, Linn. (Dead.)
Littorina irrorata, Say.
Littorina littorea, Linn. (Dead.)
Littorina palliata, Say.
Lucina dentata, Wood.
Modiola plicatula, Lam.
Modiola tulipa, Lam. (Anglesea.)
Mactra solidissima, Chemn.
Martesia cuneiformis, Say.
Melampus bidentatus, Say.
Mya arenaria, Linn.
Mytilus edulis, Linn.
Nassa obsoleta, Say.
Nassa trivittata, Say.
Natica duplicata, Say.
Natica heros, Say.
Natica triseriata Say. (young of N. heros.)
Ostrea borealis, Lam.
Ostrea virginica, Lister.
Pandora gouldiana, Dall.
Pecten irradians, Lam.
Petricola pholadiformis, Lam.
Pholas crispata, Say.
Pholas costata, Linn.
Pholas truncata, Say.
Raeta canaliculata, Say.
Solecurtus costatus, Say.

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Siliquaria gibba, Adams.
Solen ensis, Linn.
Tellina polita, Say.
Tellina tenera, Say.
Teredo navalis, Linn.
Urosalpinx cinerea, Say.
Venus mercenaria, Linn.
Venus mercenaria var. notata. Say.

Additional species found by other observers.

Anomia aculeata, Gmel.
Anomia electrica, Gld.
Bela harpularia, Couth.
Fasciolaria granosa, Brug.
Fusus tornatus, Gld.
Littorina rudis, Don.
Mactra lateralis, Say.
Macoma fusca, Say.
Mytilus hamatus, Say.
Scalaria angulata, Say.
Scalaria lineata, Say.
Sigaretus perspectivus, Say.
Solen viridis, Say.
Yoldia limatula, Say.

A MAMMOTH LAND SNAIL.

In the *West American Scientist* for April, 1889, under the head of "A New Florida Bulimulus," follows the description of an alleged species of the group above named the dimensions of which are given as "length, 19 inches, diameter 8 inches." I don't believe that my esteemed friend Hemphill ever collected a land animal of the molluscan type quite as large as this. I wish that he had and I am sure if a beast of this size exists anywhere on the planet, it should when found be named for him, for I know of no man more worthy of such an honor. Let us return to the big Bulimus and consider its dimensions and what these figures mean:

Bulimus ovatus of Müller, a Brazilian species "attains the length of six inches and is sold in the markets of Rio." It has an egg an inch in length when hatched, say the size of a robin's egg. With this for a standard, the nineteen inch fellow from Florida may be

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expected under favorable circumstances and when not otherwise occupied to furnish eggs *three inches and upward* in length and of corresponding diameter. This looks like business, and here also is a hint in the way of a new industry. I was at one time slightly acquainted, with an old man, an alleged conchologist from the sunny land of France, of whom it was stated with much probability of truth, that he cooked common cowries in acid and bedeviled them in various ways, in the effort and hope to produce the beautiful Cypræa aurantia by an artificial process. His experiments were inspired not by scientific zeal but the lust of mammon. He did not succeed. His experiments rested on an imperfect ethical basis. But with the big bulimus as above, provided one could get enough to start the business and stock a small cochlearia or snail ranch, the business would be interesting scientifically and commercially and in no way *contra bona mores.* The proportions of the dividends compared to the profits of other kinds of business, might not be quite as large as the proportions of the big Bulimulus compared with the rest of his relatives.

But alas there are many incongruities and paradoxes in this world, and with this melancholy fact before us let us rest and find consolation, while dreaming of omelets and custards made of Bulimus eggs; and let us also in kindness overlook the infelicities of typographic errors and lapses of proof-readers.

R. E. C. S.

ON THE GENUS COROLLA DALL.

BY W. H. DALL.

In 1871 I was suddenly called from my studies at the Smithsonian Institution to take charge of an expedition for a reconnaissance survey of the Aleutian Islands, under the auspices of the U. S. Coast Survey. The molluscan material collected by me in the Nothern Pacific from 1865–'68 had been the object of much care and scrutiny. The types of all doubtful or supposed new species had been sent to Dr. P. P. Carpenter, then recognized as the chief expert on the shells of the N. W. Coast. He had held them without report for two years, but under the circumstances it was not possible to delay longer. They were hastily recalled, and that nearly four years of hardship and exploration might not seem entirely fruitless, the

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most obviously new or interesting forms were made the subjects of brief diagnoses which were gathered into a paper for the American Journal of Conchology. This preliminary paper included a brief diagnosis of a remarkable Pteropod, of which the types are still extant in the National Museum, which was described (op. cit. vol. 7, pp. 137–8), under the name of *Corolla spectabilis* n. g. and sp., and supposed to have no shell. These animals caught in the N. Pacific, Lat. 42°50′, W. Lon. 147°25′, in the tow-net, were preserved alive for three days and carefully drawn to scale in water colors before being consigned to spirits for preservation. As they seemed lively and perfect the conclusion was natural that they were normally shelless. Subsequently, on my return to civilization in 1875, after much study I became convinced that these animals were more related to *Tiedmannia* but had lost their shell. The latter is gelatinous, slipper-shaped, and covered with small tubercles weighing several times as much as the animal, which is very slightly attached to it and is therefore detached with great facility. The genus *Gleba* Forskäl was similarly described from a detached animal.

In his report on the *Pteropoda* of the Challenger Expedition, Dr. Paul Pelseneer received from me copies of all my unpublished sketches and specimens of several of the species, though not of *Corolla spectabilis* as the jar containing the latter was temporarily inaccessible. A brief description of the shell was also sent. In his report on the Challenger Pteropods he combines with my sketch and diagnosis certain defective fragments collected by the Challenger party which appeared to him to belong to the genus *Gleba*, to which he accordingly referred *C. spectabilis;* the name *Corolla* naturally becoming in this way a synonym of *Gleba*.

But the "shell" of *Gleba* is of a totally different character from that of *Corolla*. It is almost flat, shallow and not slipper-shaped. The detached "shells" which I took in the tow-net about the time I collected the types of *Corolla* do not resemble *Gleba*, but are nearly identical with those possessed by *Cymbulia calceola* Verrill, an analogous Atlantic species. The reception, from the Fish Commission, of specimens of *C. calceola* and of specimens of *Corolla spectabilis*, with the shell, from the Santa Barbara Channel, California, leave no doubt of this. The soft parts of these two species also differ materially from those of *Gleba*, and *C. calceola* has therefore been made by Dr. Pelseneer the type of a new group which he has named *Cymbuliopsis* (Challenger Pteropods, *Thecosomata* p. 100, fig.

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2, 1887), which also includes *C. vata* Q. & G. With the identification of the true shell of *Corolla*, this name becomes unnecessary, and *Corolla* resumes the generic rank I assigned to it, with the addition of a second species, *Corolla calceola* Verrill (sp.) from the eastern coast of United States; *Cymbuliopsis* becoming in its turn a synonym. The details of structure I hope to publish later with illustrations; the object of this note is merely the rectification of the synonymy. In a general way I should be indisposed to claim priority for a name which was imperfectly characterized in publication, but Dr. Pelseneer has set the example by adopting *Gleba*, which stands in exactly the same predicament and as it is really the best plan (except in very glaring cases) to take the first identifiable name, I follow his example.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

173.—*Sphærium sulcatum* Lam., 1818.

This, the largest species of the genus in America, is widely distributed throughout New England, and the Middle and Western States and Canada, and inhabits rivers and large ponds. It presents much variation in size and color. It has been known best in this country by the name of Cyclas similis Say, but Lamarck's name has priority. The animal is white with light orange siphons. The shell is transversely oval, nearly equilateral, very light for its size; valves convex, broad across the beaks, which are but slightly elevated above the general curve of the shell; interior bluish; exterior dark chestnut; surface concentrically wrinkled with strongly-raised lines, with a broader band corresponding to each year's growth. Length, $\frac{7}{10}$, heighth, $\frac{1}{2}$, breadth, $\frac{1}{3}$, inch. The young shells do not resemble the adults, and might well be mistaken for another species; they are thin and compressed, with both ends truncated and resemble rhomboideum; in fact most of the specimens in cabinets labeled rhomboideum are simply the young shells of sulcatum. The color of the young shells is lemon-yellow, but as they grow older a dark shade appears at the beaks and gradually spreads downwards until it covers the entire surface. In intermediate stages there is a yellow zone on the lower margin. They are found in R.

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I. in the Ten Mile River, and are very abundant in the Blackstone.

Genus *Pisidium*, Pfeiffer, 1821.

This genus was confounded by earlier writers with Tellina (a marine genus) and still later with Sphaerium. Pfeiffer first observed the difference in both animal and shell and proposed the name of Pisidium for this group.

The animal of Sphaerium has the lobes of the mantle united posteriorly, into a tube, single at the base, but separated into two siphons at the extremities, while in Pisidium it is united its entire length.

The shells of Sphaerium have the beaks central, dividing the hinge margin into equal parts, and the cardinal teeth are situated immediately under the beaks; in Pisidium the beaks are terminal, *i. e.*, nearer the posterior extremity; the cardinal teeth also are terminal and the ligament is on the shorter side. The teeth of Pisidium are stronger and more robust in proportion to the size of the shell than in Sphaerium. The habits of the animals are the same, burrowing in mud or attached to the roots and stems of aquatic plants. The best time to collect these shells is from April to July.

There are eight species in New England, three of which have been found in R. I.

174.—*Pisidium abditum*, Haldeman.

Shell rounded-oval, elongated, margins well rounded; beaks small, raised a little above the curve of the shell; surface smooth, not distinctly striated; epidermis generally straw color, but sometimes dark and the surface rough and coarsely striated; cardinal teeth small, separate; the anterior one larger and prominent; lateral teeth short. Length, $\frac{15}{100}$, height, $\frac{14}{100}$, breadth, $\frac{8}{100}$, inch. Inhabits nearly all of North America, is very common and is found in swamps and on the margins of small streams.

P. aequilaterale, compressum, ferrugineum, and ventricosum are species which occur in Maine, Massachusetts and New York, but have never been found in R. I. They are widely distributed over other parts of the country and may possibly inhabit R. I., although not yet observed. P. abditum was described by Haldeman in Proc. Acad. Nat. Sci. Phila. i, 53, 1841, and has twenty-five synonymous names.

(*To be continued.*)

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BRIEF NOTES ON THE LAND AND FRESH-WATER SHELLS OF MERCER COUNTY, ILL.

BY WILLIAM A. MARSH.

Sub-genus *Planorbula*, Haldeman.

101.—*Segmentina armigera*, Say.

Shell varied in color, from very dark horn color to almost white, spire regular, slightly concave, suture well impressed, whorls four, longer than wide, carinated above, aperture oblique, labrum usually of a darker color on the edge. Within the aperture are five teeth, two on the pillar lip, one near the anterior lip, one on the side of the labrum, and two on the upper portion of the outer lip. This interesting shell has a range from Maine to Colorado. It is rather common here about our small ponds, being usually found associated with *P. exacutus* and *P. parvus*. It may be found adhering to sticks, bark and pieces of pine boards where the water is very shallow.

ANCYLUS Geoffrey, 1767.

102.—*Ancylus rivularis*, Say.

Shell pale yellow, opaque conic, depressed; apex obtuse, nearer to and leaning towards one side and one end; aperture oval, rather narrower at one end, entire. This shell is very abundant along the margin of the Mississippi River; found adhering to the limestone rock in the river, also on limbs of trees, dead leaves and old valves of Uniones. I have one valve of a *Unio ellipsis* in my cabinet that had 25 of the *Ancylus* on it.

103.—*Ancylus parallelus*, Haldeman.

Shell pale, thin, fragile, lengthened, narrow, apex rather short, sharp, conspicuous, with two-fifths of the shell posterior to it. Inhabits Pope Creek, in this county; has never been found elsewhere. When found at all it occurs very abundantly, adhering to sticks, stones and dried leaves. I have found it attached to live specimens of *Pleurocera subulare*.

104.—*Ancylus tardus*, Say.

Shell conic, depressed, apex behind the middle, obtuse, rounded, inclining backward, line from the apex to the posterior tip rectilinear; line from the apex to the anterior tip arcuated; aperture oval.

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I found this shell in a small slough near Edwards Creek, in Green Township, adhering to flat limestone rocks. I have never found it in any other locality. It is probably very rare here.

GENERAL NOTES.

ON HELIX (ARIONTA) KELLETI FBS.—Twenty years ago, Dr. J. G. Cooper, writing of the west coast helices, mentioned the finding of *Arionta Kellettii Fbs.*, upon the seaward side of Point Loma, at the entrance of San Diego bay. He remarked upon the great number of dead shells and the scarcity of the living, from which it was inferred that they were dying out. The same state of affairs exists to day. The steep hillside is thickly strewed with dead shells of the form of *Arionta Kellettii*, now generally known as *A. Stearnsiana*, while living specimens are hard to find. The dead shells are in all stages, from fresh and bright to chalky and broken, showing that a comparatively small number of individuals are living at one time, yet enough survive to keep the race intact.—*E. W. ROPER.*

PUBLICATIONS RECEIVED.

CONTRIBUTIONS FOR A SYSTEMATIC KNOWLEDGE OF THE AQUATIC SHELLS OF TASMANIA, by W. F. Petterd. In this valuable paper Mr. Petterd has revised the fresh-water shells of Tasmania, giving especial attention to the minute Paludinoid forms, which in Tasmania as everywhere have been very imperfectly understood. Most of them belong to the genus *Potamopyrgus* of Stimpson, a group including also all of the New Zealand non-marine Rissoids. The new subgenus *Beddomeia* (name preoccupied by Nevill, Handl. Moll. Ind. Mus. i, p. 127) is proposed for *Amnicola launcestonensis* Johnson, and other species, and *Brazieria* for the *Ampullaria tasmanica* Tenison-Woods. A number of new species are described and figured as well as the radulæ of various genera. The importance of work of this sort can hardly be over-estimated at the present stage of Malacology. —*H. A. P.*

ON CERTAIN PARASITES, COMMENSALS AND DOMICILIARES IN THE PEARL OYSTER, by R. E. C. Stearns. (Smithsonian Report, 1886, pt. 1, p. 339.) The author of this paper discusses in characteristically graceful style the interactions between parasites, domiciliares and

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their hosts. By "domiciliares" are meant creatures which live upon or burrow in shells, "not for the purpose of getting at the softer parts of the mollusk upon whose shell they have 'squatted,' in order to use said soft parts for food, but solely for the purpose of a residence or domicile." Such are the pholads (Penetella) which stake out their mining claims on the *Haliotis rufescens*. But most extraordinary of all is the case of certain little fishes of the genera *Fierasfer* and *Oligocottus*. These little fellows enter the gaping shell of Meleagrina, impelled I suppose by greed for a meal or perhaps by a Pandora-like curiosity to see what is within the rough valve-lid. Once inside they "find no obstruction to their course as they push their way towards the interior between the mantle and the smooth inner surface of the valves until they approach the adductor muscle, and here they find a barrier which causes them to expend somewhat greater activity or energy, and in a corresponding degree disturb the serenity if not the structural economy of the oyster." And here the explorer is "entombed in pearl." Three plates accompany the paper, showing the struggling, tired, little minnows as neatly over laid with pearl as Chinese josses inside a *Dipsas* shell. *Oligocottus* has not previously been observed caught in this way.—*H. A. P.*

An excellent list of Rhode Island Mollusks by Mr. H. F. Carpenter has been received, and will be commented upon in the August NAUTILUS.

MOLLUSCA OF MINNESOTA, by Uly S. Grant. Another brief contribution to a knowledge of Minnesota Mollusks appears in the recently issued report of the Minn. Geol. and Nat. Hist. Survey. It includes notes on thirteen forms not before recognized in the State, besides additional remarks on species previously noted. It is understood that Mr. Grant will shortly have ready a revised annotated catalogue, bringing together the matter already published, and incorporating also notes on the material acummulated during the progress of the Survey. His personal field work during several seasons in the northern and other unfrequented portions of the State has no doubt brought to light many important facts.—*C. R. KEYES.*

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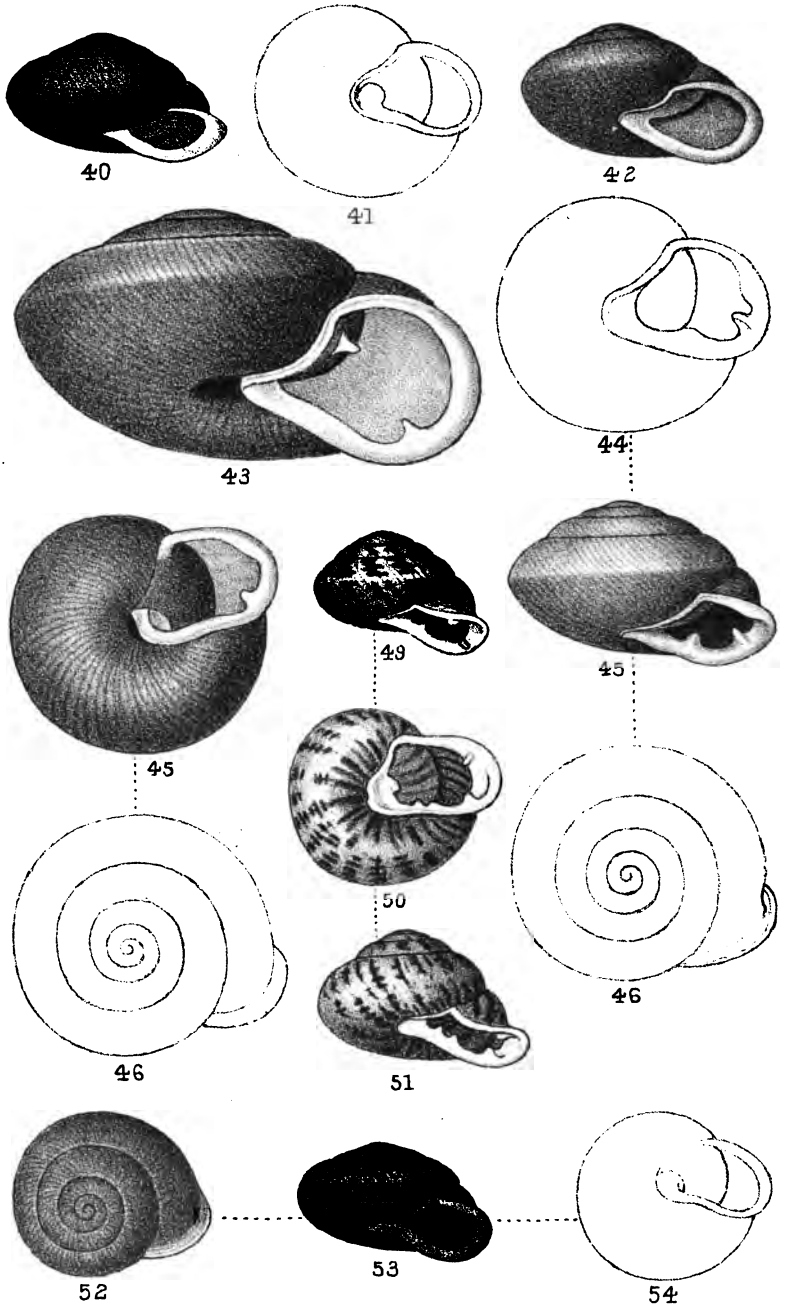

Specimen plate of PILSBRY'S Continuation of
TRYON'S MANUAL OF CONCHOLOGY.

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NOTICE TO CONCHOLOGISTS.

The undersigned has recently returned from the coast of Lower California with a good series of shells, and will spend the summer and fall on the northern Coast of the Pacific States, and in the mountains of Idaho and the interior in the interest of Conchology. On his return he will publish a new Catalogue and Price List of his North American Shells. It will contain the names of nearly two thousand species and varieties, all collected by himself personally. Conchologists who contemplate adding American shells to their collections will find it to their advantage to defer purchasing until the Catalogue is ready for distribution; notice of which will be given in this Journal.

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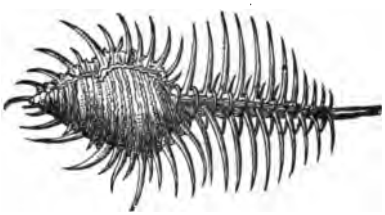

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THE NAUTILUS.

VOL. III. SEPTEMBER, 1889. No. 5.

NOTES ON PHYSA TRITICEA OF LEA; ITS RELATIONS AND COMMENTS ON THE VARIATION, Etc., OF PHYSÆ.

BY ROBERT E. C. STEARNS.

THIS California pond snail was described by Dr. Lea in 1856, from specimens collected by the late Dr. John B. Trask, in Shasta County. It was afterwards collected by Dr. J. G. Cooper inferentially in "South and East Oregon," as he adds these localities in his "Geographical Catalogue" to that previously given. In May, 1883, and subsequently, I detected it in springs in the vicinity of Auburn, in Placer County, at an elevation of about 1,300 feet, and collected at first between sixty and seventy specimens, subsequently more. It seems rather to have escaped the attention of collectors; or if found, has perhaps been labeled under some other name; as like nearly all, if not all, of the alleged species of Physa, it exhibits more or less variation when numbers of individuals are compared, even when such individuals are a part of the same colony.

The form to which Dr. Lea gave the name of *triticea* is, on the whole, rather persistent, and adheres quite closely to the type, as given in Binney *(figure 160); it is thirty-four hundredths (.34) of an inch in length. My specimens of the same length agree closely and generally with the figure, though the larger individuals, forty-six hundredths (.46) of an inch in length, exhibit some differentiation in the twist of the columella when compared with the smaller ones.

The largest are hardly typical, and though collected very near (within a half mile of) the smaller and more nearly typical forms,

* L. and F. W. Shells of North America, Part II, p. 94; S. I. Coll., No. 143.

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were found living in one respect, at least, under a different condition. Without entering into a general revision of the North American *Physadæ*, a task which, sooner or later, will be required, I will state that I regard *P. triticea* as simply an immature aspect of the almost universally distributed *Physa gyrina*, and the larger specimens collected by me at Auburn, though smaller than the average of adult *gyrina*, connect the two.

The conditions under which the Auburn lots occur are as follows: The smaller, which would surely be placed with *triticea*, were collected close to springs, where the flow of water at its maximum is small, and its catchment is limited and confined in small hollows. A part of the year these springs must be quite dry, though most of the time yielding a feeble trickling stream. Colonies of *Physæ* became established hereabouts, but when mature, attain a size hardly equal to that of an ordinary *P. gyrina*, minus the final whorl, and showing the characters that *P. gyrina* exhibits from the apex down to and inclusive of the penultimate whorl. It is an arrested, undeveloped form, equal to *P. gyrina* adolescent. The larger Auburn specimens, though still exhibiting much of the aspect of *triticea*, indicate, as before implied, their relation to *gyrina*, and were collected where the flow of water is generally permanent and the quantity much greater than in the other instances, but still where there is not even a permanent pool, and no runway of water that could be called a permanent brook or streamlet.

The geological character of the region is a slate that is folded and tilted and tipped; it seems much more favorable to the formation of small springs than to permanent brooks and flowing streams, though the latter are occasionally met with, being fed by the melting snows of higher elevations.

The surface of the pond snails, which authors describe with a nicety that would be commendable if it were not so often absurd and embarrassing, varies exceedingly in texture, sculpture and color; adolescent individuals of the same species or colony may be pellucid, and mature ones opaque; young shells may have a smooth surface, and old ones exhibit growth lines; the surface in some may be even, in others malleated, and so on; and color is modified if the specimens, when collected and placed in water, are allowed to remain until maceration has reached a putrid stage, when the interior of the shell becomes blackened either by the adherence of decayed matter or by chemical discoloration; the membranaceous composi-

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tion of the shell is also impaired and the limey portion made more conspicuous through its general bleaching effect and whitening of the callus of the columella. Mr. Tryon's *Physa politissima*, collected by Rev. J. Rowell, at Sacramento, and described and figured in Am. Journ. Conch., Vol. I, 1865, is probably one aspect of Lea's *P. triticea*. It is from a lower station, with an elevation variously stated as from thirty-one to eighty-two feet above sea level, and within the same drainage system.

The summing up of the foregoing leads to the conclusion that the first-named species (that made by Dr. Lea) is but a dwarfed and arrested aspect of *P. gyrina*, and Mr. Tryon's species is but another facies of the same.

Of the number of species that have been made upon characters that are simply those of adolescence, it would be interesting to know. Doubtless a great many, and not only among the fluviatile and lacustrine forms, but among marine forms also. This fact almost daily presents itself where one's routine work is the selection of specimens or examples for a great museum, and the determination of species from a great mass of material. Sometimes one is led to think that it is a pity, either that animals are not born fully grown, or that those who describe them do not bear in mind the fact that mollusks, etc., like men, have to advance by gradual growth from babyhood and the various stages of adolescence to maturity.

HELIX NEMORALIS IN VIRGINIA.

BY H. A. PILSBRY.

The *H. nemoralis* does not appear to have been naturalized in America except at Burlington, New Jersey, where it was introduced by Mr. W. G. Binney, many years ago. A short time since, I received a parcel of *nemoralis* shells from Prof. Jas. H. Morrison, of Lexington, Va. In response to a letter of inquiry Prof. Morrison gives the circumstances of its introduction as follows:

"The first specimen was found in the grounds of the Virginia Military Institute, in 1886, and was sent to Prof. Baird, who called it 'Helix hortensis,' stating that this was a new locality. A few days afterwards I found quite a number of specimens and sent part of them to Mr. Tryon, who said they were 'Helix nemoralis', and gave all the necessary information to establish this point. I found

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upon examination that they were brought here in earth in flower pots, though from what locality I could not fix. The banded form was first introduced, like that in the top of the box sent by this mail. I have planted several colonies in this region and they have all done well and are breeding rapidly; as evidence of this I collected over 400 specimens in about one hour's time in a circle, the radius of which was not more than 25 yards. I send by this mail a small box containing the different varieties of color and stripe collected up to date. If you can give me the names of any parties who would be interested in them, it will give me great pleasure to send specimens."

The series comprises many of the band combinations seen in European specimens. The shells seem to be indistinguishable from natives of the old world. The English conchologists have attempted to catalogue and name the color varieties of these five-banded snails—the *Pentatœnia* of Schmidt—and with a view to ascertaining just what forms are represented in America, I sent the specimens from Lexington to Mr. T. D. A. Cockerell, of West Cliff, Colorado, who kindly furnished me the list of some fifteen named forms. Mr. Cockerell writes: "The specimens could not in any way be distinguished from those of Europe. It will be interesting to compare another series with the present from the same locality five or ten years hence, and see whether the environment has greatly affected the variation. Indeed, it would be good to collect and catalogue say two hundred and fifty specimens every year, if they are numerous enough."

It would be interesting to observe whether the several color varieties intercross freely, or prefer to breed with individuals of their own color-pattern, and so perpetuate and intensify the color-races. If the latter be true, it will tend to establish the theory of "divergent evolution through cumulative segregation," by which Mr. Gulick explains the divergence of the numerous species of *Achatinella* inhabiting the same districts of the Sandwich Islands, and living apparently under identical environments.

SCALARIA ANGULATA IN NEW JERSEY.

Ed. Nautilus, Dear Sir:

In response to the request appended to the catalogue of Southern New Jersey Marine Shells, published in the July number of the

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NAUTILUS, I have received from Mr. Uselma C. Smith, of Philadelphia, a fine specimen of *Scalaria turricula* Sowb. found by him at Anglesea, New Jersey, July 20, 1889. This is essentially a West Indian species, and, so far as can be learned, has not heretofore been secured north of Jacksonville, Florida, where the specimen now in the Philad'a Academy was collected by Gen'l. F. E. Spinner.

Quite a number of *Scalaria angulata* Say, were also secured by Mr. Smith and son, at the same time and place. These were all "dead shells" but in excellent condition.

Although Prof. A. E. Verrill has reported this species as "occurring on the outer beach of Egg Harbor" it must have appeared there very rarely indeed, as the writer has searched that particular beach many scores of times during the last twenty-five years without discovering a vestige of it.

With this single exception there appears to be no authentic evidence of its presence on the New Jersey coast prior to the date above given. The finding of *S. turricula* so far North together with living *Modiola tulipa* Lam. suggests the presence of other West Indian forms in the same locality. For this reason it is hoped that collectors who have the opportunity will make a thorough search of that part of the coast especially.

Mr. Smith's discovery near the same point of living *Littorina littoria* Linn, is also of interest to the student, as it probably is the most southern locality from which these well-known denizens of the rocky coasts of New England have been reported.

JOHN FORD.

Philadelphia, July, 1889.

NOTES ON FLORIDAN SHELLS.

BY F. C. BAKER.

While pursuing Conchological studies at Micco, Brevard Co., Florida, this last winter, I had opportunity to compare the species which are common to both the Northern and Southern shores.

The little Gemma gemma Totten, I found quite plentiful in the Indian River, and specimens of Bulla solitaria Say, were not uncommon. Cylichna oryza Totten, and Utriculus canaliculatus Say, both species being common at the North, were taken in considerable quantity in the dredge.

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I was very much surprised to find in one of my hauls with the dredge, a number of very perfect specimens of *Turbonilla interrupta* Totten, associated with *Odostomia interrupta* Say, and also *Nucula proxima* Say.

One of the most abundant Mollusks of the South seems to be *Melongena corona* Gmel. This shell is to be found upon the salt marshes (Savannas) in great numbers, and of all sizes from a half inch in length to over four inches, and through all degrees of perfection. I collected one day in a single hour 360 of these shells comprising one of the finest series of this mollusk that could be imagined. I noticed among them a number of specimens having a double row of spines, all the way around the whorls. This variety has been named bispinosa by Philippi but the characters are not constant and the name therefore does not stand.

SUMMER STUDIES IN CONCHOLOGY.

BY PROF. JOSIAH KEEP.

For several years past a class in Conchology has been connected with the Chautauqua Assembly at Pacific Grove, Monterey, Cal. This Assembly meets annually about July 1, and continues its sessions for the space of two weeks. During this time there are numerous lectures, concerts, and other intellectual exercises, many of which are of a high grade of excellence. Such a programme, given at this delightful watering place, naturally attracts many visitors beside those who are engaged in the regular Chautauqua course of studies. The past season has been no exception, but the interest has been deeper and the attendance larger than on any previous occasion.

The science classes were mostly held at nine o'clock in the morning, and were followed by a public lecture. Excursions to the beach were made at various times, particularly in the early morning, in order to take advantage of the very low tides which occur then, about the time of the new and the full moon.

The class in Conchology was no respecter of persons in regard to age or occupation. Around the tables on which our shells were spread were seated matrons with gray hair, boys and girls, young men and women, ministers of the gospel, teachers from our schools, here a young man from the farm, and beside him a mother leaving

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for a little the duties of home. Perhaps in all the country, a similar class with a similar object could not be found.

And that object was the study of mollusks, particularly those species which were to be found in the immediate vicinity. Not so much a critical examination and discussion of the fine points of difference between similar species, but first of all a study of the structure and nature of the soft parts of the animal, then the mode of growth of the shell, the names of its parts, and its general morphology. After this, as far as time permitted, a study of the local species, and of others which have their home on adjacent parts of the coast. The apparatus was of the simplest kind. One morning a quantity of limpets were brought in for examination. Some were put into jars of sea-water and their motions observed. Others were deprived of life by a fresh-water bath, and distributed around the tables. After an examination of the foot, mantle, head, etc., penknives were used to slit the head, and common pins were employed to dissect out the buccal mass. A microscope was at hand to show the sharp teeth, and many were the expressions of surprise and interest in connection with the whole lesson. Valuable suggestions were made by members of the class, and many cabinets of shells were begun or received additions.

After a start had been made, the writer's book, "West Coast Shells," was freely used. Descriptions were read, engravings examined, and pronunciations recommended On the tables were spread numerous examples of dry shells, many of them imperfect, just as they had been gathered from the beach. From these mixed piles the members of the class drew out specimens of the shell under consideration at any particular time, and were given such hints and directions as would tend to fix its main features in the mind, and guard them on the one hand from confounding it with similar species, and on the other from separating it from its brethren on account of mere varietal differences.

The two weeks of study passed all too quickly, but even in that brief time good results were obtained. Not results of a critical nature, not important contributions to the science; very few have the ability or the opportunity to accomplish these. But our science ought not to be simply for the scholar and the specialist. The people in the common walks of life have a keen sense of the beautiful, and the interesting features of common objects have but to be pointed out to be appreciated. Life is made more rich and full as

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new admiration is evoked, and what is better fitted to call it forth than a careful study of the beautiful objects of nature. Moreover, observation is quickened, interest aroused, and knowledge is increased. The danger which lies in the spread of popular science is not found in the contemplation of real facts and real objects, even if they are studied but slightly; it must be sought, rather, in the substitution of fancies for facts, and a superficial reading or hearing about things instead of an examination of the things themselves.

Among other good results of the session was the formation of a club of subscribers for THE NAUTILUS, with the prospect of additional names in the future, as its merits become known.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

FAMILY LUCINIDÆ.

This family contains about one hundred and fifty species, distributed chiefly in the tropical and temperate seas, on muddy and sandy bottom from low water to the deepest water inhabited by the mollusca. Several of the genera are entirely fossil.

Genus *Lucina*, Brug., 1792.

There are two hundred and fifty fossil species and one hundred living. Distribution universal.

179.—*Lucina* (*Cyclas*) *dentata*., Wood, 1817.

Syns.:

Lucina divaricata, Gld. Lam. non Linné. *L. strigilla*, Stimp., *L. americana*, C. B. Adams, *L. chemnitzi*, Phil., *L. lamarckii*, Dunker, *L. eburnea*, Reeve, *L. Pilula*, C. B. Adams, *L. ornata*, Reeve, *L. quadrisulcata*, D'Orb., *Pectunculus parvus*, Lister, *Tellina divaricata*, Gmel. Chemn. Dillw. Turton, *Cyclas dentata*, Dall, Tryon, Verrill, etc.

Shell white, thin, orbicular, convex, sub-equipartite; beaks central, elevated, inclined forward; surface glossy and sculptured in a very peculiar manner, with grooves bent obliquely downwards from a line drawn, not through the center, but from a point at the anterior third; they extend to the margins and crenulate the

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edge; hinge teeth small, one in the right valve and two in the left; lateral teeth rudimentary, almost obsolete; concentric lines of growth very strongly marked. Length 1 inch, height $\frac{9}{10}$, breadth $\frac{8}{9}$.

Linnaeus in 1767, described an European shell under the name of divaricata. Lamarck in 1818 and his followers, supposing our shell to be identical with that of Linnaeus, called it by the same name. The above list of synonyms does not include all the names given by authors to this shell, for several others, besides those quoted, on discovering that our shell was a distinct species, hasten to give it a new name without troubling themselves to ascertain whether or not any one else had previously made the same discovery. Our species has the greatest geographical distribution of any known shell, but does not inhabit Europe. It inhabits from Cape Cod to Brazil, nearly all the Pacific coast of North and South America, the eastern coast of Asia, Seychelles, Isl. Bourbon and Australia, and not only found living, but also as fossils in nearly all these widely separated localities. It lives in deep water and I have never seen a living specimen in Rhode Island, although single valves are plenty on Block Island, Newport and Narragansett Pier.

Another species, Lucina filosa, inhabiting from Massachusetts Bay to Nova Scotia, has been found some distance off Block Island in 29 fathoms in sandy mud, but I think is hardly entitled to a place among the "Shell-bearing Mollusca of Rhode Island."

Cryptodon Gouldii, another species of the Lucinidæ family, inhabiting deep water and also taken from the stomachs of Codfish, was found at the same time and place with Lucina filosa; also a new species, Cryptodon obesus, A. E. Verrill, described by him in *American Journal of Science*, 111, 221, 1872.

FAMILY UNGULINIDÆ.

Not represented on our shores.

FAMILY ERYCINIDÆ.

This family contains twelve genera, three of which are represented in New England, Montacuta, Lepton and Kellia. Species of Montacuta and Lepton inhabit the shores north of Cape Cod and have been found in New Bedford Harbor, but no species representing this family have been found in Rhode Island excepting this:

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180.—*Kellia planulata*, Stimpson.

Syn.:

Kellia rubra, Gould, not of Montague.

Shell small, solid, sub-oval, inequipartite, compressed; beaks large, in contact, having before them a deep elongated, smooth areola; both ends broadly rounded; surface covered with a thick, dirty brown epidermis, eroded at the beaks; interior glossy white. Length $\frac{1}{8}$, height $\frac{1}{8}$, breadth $\frac{1}{8}$ inch.

Inhabits from Long Island Sound to Greenland, from 1 to 15 fathoms in depth. Also under stones at low-water mark and attached to the roots of seaweeds. I have found but two specimens in Rhode Island, both dead, collected in shell sand above high water mark.

FAMILY SOLEMYIDÆ.

This family contains one genus and six species, two of which inhabit Rhode Island.

181.—*Solemya borealis*, Totten.

Syns.:

Solenomya borealis, Perkins, Verrill.

Shell elongated-oblong, thin and fragile, covered with an epidermis which extends beyond the margins of the shell, except on the hinge margin, where it is lapped over and connects the valves together its entire length; the epidermis is scalloped where it projects beyond the shell, by slits corresponding to the radiating lines on the surface, extending from the beaks to the edges of the margins; the epidermis is dark brown and the radiating lines are lighter in color, fifteen to twenty in number; interior grayish-blue. Length two inches, height $\frac{1}{2}$.

Col. Joseph G. Totten found this species in the vicinity of Newport, Rhode Island and described it in Silliman's Journal, xxvi, 366, 1834. It has never been seen in our bay excepting at Newport, but has been found at Chelsea, Nahant, Portland and other ocean shores of New England.

182.—*Solemya velum*, Say.

Syn.:

Solenomya velum, Perkins, Verrill.

This species inhabits from North Carolina to Nova Scotia. It was described by Thos. Say from specimens found on the southern coast

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in 1822, in the Journ. Acad. Nat. Sci., Phila., ii, p. 317. It resembles the previous species very closely, but is distinguished from it as follows: The shell is much smaller, being only one inch in length, half an inch in height, and $\frac{3}{10}$ in breadth. The valves are more convex, thinner and more transparent, the epidermis is pale yellowish-brown and the interior purplish-white; the scalloped edges of the epidermis are rounded, while in borealis they have a square appearance, very thin at the ends and rolled back. In young specimens the epidermis is entire (not slit as in the older ones). It is not a very common species but is found quite plentifully in March and April in Narragansett Bay. They live at and below low water in sand and in mud.

FAMILY CRASSATELLIDÆ.

Not represented in North America.

FAMILY ASTARTIDÆ.

This family is divided into two sub-families, Astartinæ and Carditinæ.

SUB-FAMILY ASTARTINÆ.

This family contains fifteen genera, thirteen of which are fossil.

(*To be continued.*)

GENERAL NOTES.

Mr. W. G. BINNEY has in preparation a Third Supplement to the *Terrestrial mollusks vol. V*, in which it is purposed to bring the subject up to date, and figure and describe the species discovered since the publication of the Second Supplement two years ago.

HYALINA STERKII DALL. A tiny species of *Conulus* or *Hyalina* discovered by Dr. V. Sterki in Ohio, is described by Dr. Dall in Proc. U. S. Nat. Mus. 1889 (separate copy received Aug. 24). It is scarcely over a millimeter in diameter, and about a half that height. It will be figured in a later number of THE NAUTILUS.

HEMPHILLIA AND PROPHYSAON have both been collected by Henry Hemphill at Old Mission, Cœur d'Alene, Idaho. (W. G. Binney, in letter to Ed.) This extends the range of these peculiar slugs considerably eastward. In this part of the Northwest many other Pacific slope forms extend eastward and mingle with the East American types.

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States species, including a number of species not contained in the latest monographs. The geographical range of each form is given, and the whole prefaced by a brief discussion of recent or original changes in nomenclature. Collectors of American shells will find the list a convenient one for checking their collections and their *desiderata* when exchanging.

UEBER DIE BEZIEHUNGEN *einiger europäischer und nordamerikanischer Pupiden*, by Dr. V. Sterki. (In Nachrichtsblatt d. deutchen Mal. Gesell., Juli–Aug., 1889.) Dr. Sterki discusses the Pupæ common to America and Europe in this valuable paper. Species immediately allied to *P. muscorum* are *P. blandi* (doubtfully distinct), and *P. sterri* Voith; the last seem to the writer to be also a form of *muscorum*. The species is a mountain form, described from Bavaria. *Vertigo simplex* and *P. alticola* are considered synonyms of *P. edentula* Drap. The examination of the *Vertigo* species, Dr. Sterki says "hat mich viel Zeit, Mühe und 'Augenmörderei' gekostet;" and it is no wonder, as anybody who has been so rash as to trouble themselves with those ridiculously little creatures will bear testimony. The question of the identity of V. antivertigo Dr. and ovata Say, is discussed; and finally the new subgenus *Augustula* is proposed. The principal characters are the narrowing of the last whorl, peculiar constriction behind the peristome, the longitudinal position of the columellar fold, and the long, narrow, high fold, arising deep in the throat, and in *venetzii* uniting with the upper, in *milium* with the lower palatal fold. It contains only the two species named.—P.

NOTES ON SOME INDIAN TERRITORY SHELLS, by Charles Torrey Simpson. An interesting paper, adding considerable to our knowledge of the distribution of the shells of this region. *H.* (*Triodopsis*) *conei* Wetherby, formerly known from Eastern Texas, was found in the Territory. A form of *H.* (*Polygyra*) *jacksoni* with elevated deltoid parietal tooth is described as var. *deltoidea*. *H.* (*Mesodon*) *Kiowaënsis*, a form intermediate between *thyroides* and *sayii* is described as new, and the rare *Helicodiscus fimbriatus* is reported from near Fort Gibson. The shells described by Mr. Simpson under the name *Zonites capsella* are quite distinct from that species, as I have satisfied myself by careful comparisons. It may be called *Z. Simpsoni*, in honor of the finder. Mr. Simpson's remarks on the *Bulimulus dealbatus*, *schiedeanus* and *alternatus* should direct the attention of collectors to these forms, which are believed by Mr. S. to be varieties of a single variable species.

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EXCHANGES.

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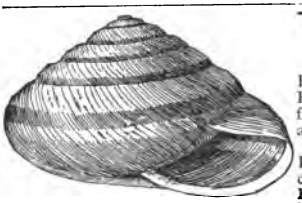

Helix (Aglaia) fidelis, Gray, Oregon.

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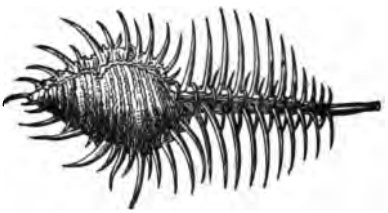

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THE NAUTILUS.

VOL. III. NOVEMBER, 1889. No. 7.

THE VIRGINIA COLONY OF HELIX NEMORALIS.

BY T. D. A. COCKERELL.

Perhaps some of your readers, when they see the long list below of varieties differing only slightly from one another, will think it a case of much ado about nothing, and wonder where the interest can be in such minute differences of color or banding.

In these days it ought to be unnecessary to apologise for going into precise detail in scientific matters, but I will venture to point out that the present case is one of quite exceptional interest.

Here we have an exceedingly variable species, whose varieties have been extensively studied in its native country—Europe, and found to differ greatly according to locality and circumstances. A few of these varieties may be traced to definite causes—most of them appear to occur causelessly, which is another way of saying that the cause is, in these cases, as yet unknown. A highly variable species, then, is introduced into a new continent, where climatic and other conditions differ markedly from those of its native home. It is certain to vary—it varies everywhere—will it not, then, be influenced in its variation by the new environment, and produce, perhaps, new and unheard-of forms? And if so, shall we not thereby have a valuable clue to the nature of these forms, and the general principles which underly the phenomena of variation in this and perhaps in other species? In the endeavor to answer these questions I shall feel excused, both now and hereafter, if I seem to go into these matters more minutely than is usual with conchological work. Myself, I believe that in the noting of minute differences

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lies everywhere our best chance of ascertaining the principles of evolution.

The varieties of *Helix nemoralis* are classified according to the following principles: First, variation in the ground-color of the shell, with the name *libellula* for yellow shells, *rubella* for pink shells, *petiveria* for pale brown or fawn-colored shells, etc. Secondly, variation in the banding, for which a band-formula is used. The typical shell has five bands, three above the periphery and two below, and its formula is accordingly 12345. If a band is missing, a 0 is placed in its stead—thus 12045 has the third band of the type missing, while 00000 is the formula for a bandless shell. If two or more bands are coalesced, they are bracketed together, thus, 12(345). If a band is imperfectly developed, it is indicated as a small figure below the line, thus, $12_{3}45$. If a band is split into two, the number is repeated, as 1233(45), while an extra band which cannot be assigned to any of the usual five, is represented by an X, as 003X00. The formula should always be taken from near the mouth of the shell. These, then, are the ordinary kinds of variation, while other unusual characters are expressed in suitable terms, as *tenuis* for a very thin variety, *compressa* for a depressed form, *minor* for a small form, *albolabiata* for a white-lipped shell, etc. These terms are used in conjunction with one another, to indicate the different peculiarities of any given shell. The band-formulæ express themselves, and need not, as a rule, have the name of their author quoted after them. But in introducing these band-varieties to the American fauna, I have given the names of their first recorders, as a hint to their history in Europe. For certain of them, I have given special names bestowed by French authors—as *brissonia* for *petiveria* 12345. If these names are to be adopted, it will be necessary to bestow many new ones, as a large number of combinations have not come under the notice of the aforesaid authors, but to my mind it is more convenient to use the band-formulæ in conjunction with the color-names. There is only one thing to be said for the names given to combinations, that if misprinted they can hardly lead to any real confusion, whereas band-formulæ may be misprinted easily enough in such a way as to lead to erroneous records, which may never be corrected.

All the shells of *H. nemoralis* I have seen from the colony at Lexington, Va., were collected by Prof. J. H. Morrison, and number altogether 103. The first consignment, sent me through Mr. H. A.

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Pilsbry, was rather disappointing, in that it consisted entirely of well-known European varieties; but more recently a larger collection sent by Prof. Morrison has presented several forms of great interest, showing a general tendency to the splitting-up of the bands, as in *Helix multilineata*. The following is a list of the whole lot, with the numbers of specimens of each:

No. of Specimens.

(1.) *libellula* 00000 = *libellula* Risso. . . . 14.
(2.) *libellula* (12345) = *Kleinia* Moquin-Tandon . 5.
(3.) *libellula* $_{12}$345 Fenn. . . . . 1.
(4.) *libellula* 12345 = *quinquefasciata* Moq. = the type . . . . . 14.

(Two of these have a white rib, and thus fall also under *bimarginata* Picard.)

(5.) *libellula* 1233(45) Chem. . . . . 1.
(6.) *libellula* 123X45 Ckll. (X is a mere line, 4 is very broad) . . . . . 1.
(7.) *libellula* 123X(45) var. nov. . . . . 2.
(8.) *libellula* 123$_x$(45) var. nov. . . . . 1.
(9.) *libellula* 123$_4$555 var. nov. . . . . 1.
(10.) *libellula* 12$_{3xx}$(45) var. nov. . . . . 1.
(11.) *libellula* 0$_{22}$345 var. nov. . . . . 1.
(12.) *libellula* 123(45) = *reaumuria* Moq. (Some shows the least sign of a band between 2 and 3) . . . . . 17.
(13.) *libellula* 10345 = *argentvillea* Moq. (2 are also *bimarginata*) . . . . . 11.
(14.) *libellula* 12(345) Kreglinger . . . . 1.
(15.) *libellula* (12)3(45) = *poirctia* Moq. . . . . 3.
(16.) *libellula* 1233$_3$45 var. nov. . . . . 1.
(17.) *libellula* 1$_{22}$345 var. nov. . . . . 1.
(18.) *libellula* 10045 Kregl. = *Sionnestia* Locard. . 1.
(19.) *libellula* 12$_3$45 v. nov. . . . . 1.

(This is new only in the sense of being unpublished. I have seen it with a pink ground-color (*rubella*) from Truro, Cornwall, England, collected by Mr. J. H. James.)

(20.) *libellula* 00345 = listeria Moq. . . . 1.
(21.) *libellula* $_1$0345 Ckll. . . . . 2.
(22.) *libellula* 12045 = *favannea* Moq. . . . 3.

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(23.) *libellula* $_1$2345 Ckll. . . . . 1.
(24.) *libellula* 00300 = *cavieria* Moq. . . . 1. (juv.)
(25.) *libellula* 003(45) = *gmelina* Moq. (also *bimarginata*) . . . . . 1.
(26.) *libellula* 1(23)45 = *woodia* Moq. . . . 1.

(In this specimen bands 4 and 5 are very thick; the yellow line between 3 and 4 is very thin.)

(27.) *rubella* 003X00 var. nov. . . . . 1. (juv.)
(28.) *rubella* 12345 Moq. . . . . 2. (one juv.)
(29.) *rubella* 00300 = *guettardia* Moq. . . . 1. (pale.)
(30.) *rubella* 00000 = *rubella* Moq. . . . 1.
(31.) *rubella* 0030$_5$ Ckll. . . . . 1.
(32.) *petiveria* 12345 = *brissonia* Moq. . . . 5.
(33.) *petiveria* 123(45) = *arcelinia* Locard. (one has band 2 very broad) . . . 3. (one juv.)
(34.) *petiveria* 1(23)$_3$(45) v. nov. . . . . 1. (juv.)

All the above varieties have been found in Europe except Nos. 7 to 11, 16, 17, 27 and 34. The tendency of bands 4 and 5 to coalesce is notable in the series, but this is a frequent form of variation. The formula 00300, generally common in Europe, seems rare. But the most remarkable thing about the series is the splitting up of the bands in many specimens, forming combinations which I have never seen in European examples. This is perhaps to be regarded as the reverse of melanism, and due to dryness (I do not know the degree of moisture at Lexington), and it is well to remember that *H. pisana*, which frequents exceedingly dry places (sand hills, etc.), shows this splitting-up of the bands to excess. These new varieties are very diverse, and as yet few in number of specimens in the colony, which tends to show that they are of recent origin. If, as I believe, they are the direct result of the new environment, in a few years we shall see them predominate at Lexington, and probably more pronounced in their characters, not showing so many ill-developed bands. Here is a problem for the future!

Since I wrote last about this species, Prof. Morrison has sent me the following additional varieties from Lexington, Va., new to the North American Fauna:

(1.) *libellula* 1$_2$345 Roebuck. (juv.)
(2.) *libellula* 10$_3$45 Ckll.
(3.) *libellula* 12$_3$(45) v. nov. (juv.)

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(4.) *libellula* $_{1}0045$ v. nov. (two specimens.)
(5.) *libellula* $12_{xx}345$ v. nov.
(6.) *libellula* 12X345 v. nov. (juv.)
(7.) *libellula* $_{1}23_{3}45$ v. nov.
(8.) *libellula* $_{1}0300$ v. nov., but also British. (juv.)
(9.) *libellula* (123)(45) = *gronovia* Moq. In Europe, this variety is found in France, England, and Wales, and the Rev. A. Dean recently sent me examples of it from the Tyrol, and from the Pyrenees..
(10.) *libellula* 1(23)(45) = *brardia* Moq. (juv.)
(11.) *libellula* $1(23_{3})_{x}(45)$ v. nov. (juv.)
(12.) *libellula* $1_{2}3_{3}45$ v. nov. (juv.)
(13.) *libellula* $000_{xxx}00$ v. nov.
(14.) *libellula* $12_{3x_{4}}45$ v. nov. (juv.)
(15.) *libellula* $12_{x}3(45)$ v. nov. (juv.)
(16.) *libellula* (12)345 Moq. (juv.)
(17.) *libellula* (12)X3(45) v. nov.
(18.) *libellula* $120_{xx}45$ v. nov.
(19.) *libellula* $1_{2x}3(X4)5_{5}$ v. nov. (juv.)
(20.) *libellula* 12(34)5 Kregl. (juv.)
(21.) *libellula* 02345 = *Schræteria* Moq.
(22.) *libellula* $1030_{x}(_{5}5)$ v. nov. (juv.)
(23.) *petiveria* $12_{3}45$ Ckll.
(24.) *petiveria* $1_{2}345$ Roebuck.
(25.) *petiveria* $_{12}345$ Fenn.
(26.) *petiveria* 12045 = *Michaudia* Loc.
(27.) *petiveria* 123445 Borcherding, = var. *sexfasciata* Moq.

This remarkably variable series only emphasises the peculiarities of the previous one. There is very little variation in the ground-color of the shells.

West Cliff, Colo., Sept. 29, 1889.

COLLECTING LAND SHELLS IN SOUTHERN CALIFORNIA.

BY EDWARD W. ROPER.

"Look where you step" is a good rule to follow in any country, but it is absolutely essential in San Diego county, for two reasons. First, because it is very important, if there is a rattlesnake in your

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path, to see him before treading upon him. Secondly, because if you carelessly step on the little round cactus so common in this region, the spines, if they do not puncture the sole of your shoe, will penetrate the upper leather more surely than needles. In the eyes of an eastern collector, accustomed to look for land shells in moist, shady places, it is not a promising country. There are no woods, except on the mountains, and few streams of water around whose banks mollusks might be expected. Yet there are shells all around.

Find a cactus that is dead, and turn over its fallen leaves with a stout stick. Like the watermelon, a cactus seems to carry its own water, and under this moist, decaying mass the little Pupas may be found, and Helix Stearnsiana Gabb takes shelter from the sun. The night dews are heavy, and doubtless when darkness falls, the snails emerge from their hiding places, and browse around for food.

Another favorite collecting ground is a pile of loose rocks; if on the south side of a hill, where the sun beats hottest, so much the better. Turn over every stone until the damp earth is reached, and your eyes will be gladdened by the sight of the elegant dark brown shiny Glyptostoma Newberryana W. G. B. If the rocks are in the midst of shrubbery and herbage, the large beautifully banded Arianta tudiculata Binn. is likely to be found. Very rarely do any of these shells live on the shaded northern slopes, doubtless because where the ground is less heated during the day, less moisture is condensed at night. In this country, then, the collector truly earns his prizes by the sweat of his brow.

One other land shell is the Succinea Oregonensis Lea, of a reddish golden hue, found on the weedy river banks, and living only a little less in the water than its frequent companions Limnæa Adelinæ Tryon, and Physa Gabbii Tryon. These are the common shells of the open country, although far from numerous in individuals, when one considers the hours of diligent labor necessary to procure a reasonable number.

WHAT IS A SPECIES?

BY CHARLES T. SIMPSON.

In view of the practice of naming *everything* now-a-days by the so-called new school of conchologists, we may well ask the above question. Agassiz in classifiying animal life says, that "species are

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distinguished by size, proportion, color, habits, and relations to surrounding objects and circumstances." Like many things which we understand very well, the word is difficult to define. It is almost impossible to say just what differences are required to constitute a species or a variety. Perhaps so far as the study of conchology is concerned this definition will answer: *A mollusk which differs from all allied forms by certain distinct constant characters is entitled to specific rank.* As a friend remarked to me: "It is not so necessary that the differences between species be great as that they are constant." Any character or characters of real value that are always present on a shell ought to entitle it to a name; while no matter how marked they may be in individuals, if they imperceptibly fade into those belonging to what have been considered to be other species, they are worthless for purposes of classification. The merest novice who has given any attention to the subject, either collecting or examining cabinets of shells, knows something of how individuals of a species vary. This variation is very often produced by the circumstances by which a mollusk is surrounded,—locality, depth and condition of water, different kinds of soil and bottom, height of elevation on mountain sides, climate and the like. Baron von Tiesenhausen states that Helix cingulata, a smooth shell, is found in the valleys of Austria, H. cingulata var. colubrina, a little mottled and sometimes slightly ribbed, about half way up the mountains, and H. gobanzi, which is only perhaps a strongly ribbed form of cingulata, lives near their summits. Fasciolaria tulipa, when found in quiet muddy bays is a coarse shell with strongly-marked revolving ridges, of a dirty brownish or ash color and scarcely variegated at all; and is in every way inferior to the much larger, finely developed, smooth and handsomely variegated specimens taken in the open sea. Natica duplicata, from the vicinity of New England, is a coarse shell often flushed with brown or brownish-yellow, while specimens from the open water in the Gulf of Mexico are smooth and polished, livid in color, or even almost white. The same shell, though, when found in brackish water on the Florida coast, is more like the New England form, but is never brownish in color that I have seen. Cyrena floridana is a most variable shell even when a number are taken from the same bed; so much so that Conrad who just named it, subsequently gave to other very different specimens the appellation of C. protexta. In color it ranges from a dark purplish crimson, through purple and pink to white, and individuals may be found of

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almost every tint of blue; and in form it may be oval, the posterior end may be truncated as in Unio elegans, or it may be so drawn out as to be scarcely distinguishable when small, from Venus flexuosus. Were there no connecting links I could make a half dozen good species from the shells in my collection. Some specimens have an epidermis almost as rough as its congener C. carolinensis, while in others it is almost totally lacking. In all the species I have cited there are connecting links which show that these variations are merely forms of one and the same thing.

In view of these facts and numberless others which could be given of the extensive variability of species, and measured by such a definition as I have given of the word, how ridiculous is the practice of naming every possible variation and form, now so much in vogue with the new school of conchologists; a practice which, I am sorry to say, is not confined to them alone, nor to the present time. M. Bourguignat, who may be fairly considered a representative of this school, says he knows 162 species of Helix of the group Pomatia, and that of these he possesses 151. And he classifies them into two grand sections and nineteen series! One feels like using the language of the happy father who, when the nurse presented him with triplets, the results of a single birth, exclaimed in utter astonishment, "Great Scott! did any get away?" Why don't they name and describe every individual shell and be done with it? This would certainly be one way out of the dilemma.

(*To be continued.*)

DESCRIPTION OF A NEW SPECIES OF OCINEBRA.

BY F. C. BAKER.

Ocinebra jenksii Baker.

Shell fusiform, thick, ash-colored, shouldered on the whorls; whorls 7½, two apical smooth, rounded, white; the second is but little larger than the first; the third is provided with a distinct carina about midway of the whorl; the rest are strongly shouldered and angular. There are on each whorl nine to ten longitudinal ribs, crossed by ten very strong, coarse liræ, which cut the surface of the shell into coarse reticulations. The spire is high, pointed, and occupies about half the length of the entire shell. Aperture oblong-ovate, choco-

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late-colored, and ending below in a short, open canal. Outer lip thickened, arcuate, and five-dentate within. Inner lip smooth, covering the columella. Canal open, short, and a little deflected to the left. Umbilical region closed by the extending columellar callous.

Alt. 17, diam. 10 mill. Aperture alt. 7 (excluding canal), diam. 4 mill.

This is a distinct little shell and not referable to any species with which I am acquainted. Its nearest ally appears to be *Ocinebra circumtexta* Stearns, from which it is separated by its more pointed elongated spire, and absence of the two brown bands. The ribs in *circumtexta* are not so well developed, and the spiral liræ are not so coarse. There are seventeen spirial liræ upon circumtexta, whilst upon *jenksii* there are but ten. The greatest difference, however, is in the embryonic whorls, which in *circumtexta* are distinctly bicarinate, while in *jenksii* they are rounded. It bears some superficial resemblance to *Ocinebra gracillima* Stearns, but is separated from that species by its more angular form. The ribs, too, are more numerous in *gracillima*, and the canal is closed. The embryonic apex in *gracillima* is corrugated whilst that of jenksii is smooth. It is separated from *Ocinebra michaeli* Ford, by its much shorter canal, more rotund form, and thickened lip.

I have seen but four specimens of this species, obtained from the Wagner Collection at the Wagner Free Institute of Science, and as they show little or no variation, I am led to believe the characters are quite constant.

I am indebted to the kindness of Mr. C. W. Johnson, assistant curator, Wagner Free Institute of Science, for the privilege of studying and describing the species. The types are now deposited in the Wagner Collection. The habitat is unknown.

I take great pleasure in naming this interesting little species in honor of Prof. J. W. P. Jenks, Curator-in-Charge of the Museum at Brown University, Providence, R. I.

HELIX (STENOTREMA) HIRSUTA SAY, ON THE WEST COAST.

Of this form Mr. W. G. Binney remarks in his "Manual of American Land Shells," page 279, "a postpliocene species now found over the Northern and Interior regions as far as Kansas and Vir-

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ginia, and even into Alabama." Mr. Pilsbry in his recent Check-List of N. A. Land Shells credits it to the "Eastern United States."

The collection in the National Museum shows that it has a much wider distribution. Upon examining certain shells collected by Dr. Edward Palmer [Mus. No 37282] on the West Coast, several years ago, I found that he had discovered Say's species on the banks of the Yaqui river near Guaymas, on the easterly side of the Gulf of California. The jump was so great, across the continent or a good part of it, that I somewhat doubted my own eyes, and therefore sent specimens to Tryon and Binney to learn their opinions; both of these gentlemen confirmed my determination. Zonites (Hyalina) Binney and Morse credited to "North Eastern U. S.; Canada," by Mr. Pilsbry also makes a great leap to the westward, surpassing that of *S. hirsuta*, having been detected at Vancouver Island B. C. according to Dr. J. G. Cooper in Proc. Cal. Acad. Sciences, Dec. 31, 1887.

R. E. C. STEARNS.

Washington, D. C., Oct. 26, 1889.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

Venericordia borealis Conrad.

Shell rounded, obliquely heart-shaped, thick and strong, inequipartite; beaks prominent; elevated and recurved; surface with twenty ribs radiating from the beaks; three ribs are raised, rounded and broad, with a narrow groove between each rib, crossed by coarse lines of growth and the whole surface covered with a strong rusty brown epidermis; hinge strong; teeth two in each valve; interior white; margin crenulated. Length one inch; height one inch; breadth $\frac{7}{16}$. Inhabits from New Jersey to Labrador; generally in deep water. It is often obtained from the stomachs of fishes. Mr. S. I. Smith found specimens in Gardiner's Bay, Long Island, and one specimen was found at Sandy Hook. I have found a few specimens at Block Island. In Maine it grows to a larger size than those found further south. Woodward quotes it from the Sea of Okhotsk, which if true, shows as wide distribution both in climate and in extent of coast.

Another species, the Cyclocardia novangliæ Morse, is quoted from Connecticut to the Gulf of St. Lawrence, deep water, but has not been found as yet in Rhode Island.

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ORDER ASIPHONIDA.

Mantle margins open; no siphons; pallial impressions without sinus. This Order is sub-divided into three Sub-orders. Homomyaria, Heteromyaria and Monomyaria.

SUB-ORDER. HOMOMYARIA.

Both muscular impressions equally distinct.

(*To be continued.*)

GENERAL NOTES.

Last January a living specimen of *Glandina bullata* Gould, was received from Green Co., Ala.

After keeping it active for a few days it was put in a box, where it remained dormant until placed in a pan containing damp sod (May 4th); since then it has been out most every day.

My children delight to watch it crawl about and often handle it, letting it crawl over their hands.

Some *Patula perspectiva* Say, were put in the pan; off of them it made several meals, removing them from the shell by suction or by cutting away the upper part of the whorls, except the last one.

A *Helix muralis* Müller, was eaten without injury to the shell. A few days ago a Cut-worm was offered to it but was refused; it was then offered a *Limax campestris* Binney, which was eaten with evident relish, as were two others. They were first taken hold of in the fissure, at the base of the palpiform labial appendages, and the fore part of the foot; the buccal pouch was then protruded and the slug forcibly drawn in. The mouth is round, and I judge it to be about three-sixteenths of an inch in diameter. While in the act of swallowing, the palpiform appendages are drawn back to the sides of the head and have a slight resemblance to ears; enough so, that a boy standing by exclaimed, "see his ears; I did not know it had ears."

Later I tried it to see how many slugs it would eat at one time. Taking it up by the shell its head would be placed on a slug and in that way it picked up and ate six; the seventh it would not take hold of. This meal gorged it so that it could not withdraw wholly within its shell.—*A. A. Hinkley, Du Bois, Ill.*

PUBLICATIONS RECEIVED.

A Preliminary Catalogue of the Shell-Bearing Marine Mollusks and Brachiopods of the Southeastern Coast of the United

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States, with illustrations of many of the species, by W. H. Dall, A.M., Honorary Curator Dept. of Mollusks, U. S. Nat. Mus. (Bull. U. S. Nat. Mus. No. 37). "This work is intended to assist students of the Mollusca in the United States, by bringing together for their use a large number of excellent figures of species belonging to or illustrating the fauna of the Southern and Southeastern Coasts of the United States, from Cape Hatteras south to the Straits of Florida and west to Mexico, with the adjacent waters. These figures are explained and connected by a catalogue of the mollusks known to inhabit that region." The extreme northern and extreme southern range of each species is given, and its presence in New Jersey, Virginia, Hatteras, Georgia, East Florida, Florida Keys, West Florida, Texas, West Indies, Bermuda, Europe and West America is indicated in parallel columns. The catalogue thus comprises a dozen local lists rolled into one, and put into the most convenient possible form. We would recommend students working at localities included within the limits above given (Hatteras to West Florida), to use this work as a foundation, and omit in lists for publication the species enumerated by Dr. Dall, unless they are peculiar or local in distribution. As a hand-book for collectors of our southern marine shells, the volume is indispensable. The plates number 74, and illustrate by excellent line-engravings about one-third of the total number of species (1,635) enumerated.

A STUDY OF THE AMERICAN SPECIES OF VERTIGO, by V. Sterki, M. D. (Proc. U. S. Nat. Mus. 1888, 10pp. plate). In this paper Dr. Sterki directs attention principally to the form of the last whorl and the aperture-folds of Vertigo, and the relations of American to European species. A convenient formula is given for expressing the combinations, positions and relative importance of the teeth, the principal or primary folds being designated by letters, the smaller secondary ones by dots. Several species included by him in Vertigo (*e. g.*, P. pentodon) are said to be real Pupæ, by high authorities, and possess distinct tentacles. These tiny fellows require further study. The subgenus *Angustula* is proposed for our V. milium and the European V. venetzii. The group is apparently a natural one, but the name proposed must give way to Moquin-Tandon's *Vertilla*, proposed in 1855 for the last-named species. The figures are excellent, and the whole paper is highly instructive and suggestive, giving evidence of much careful research.

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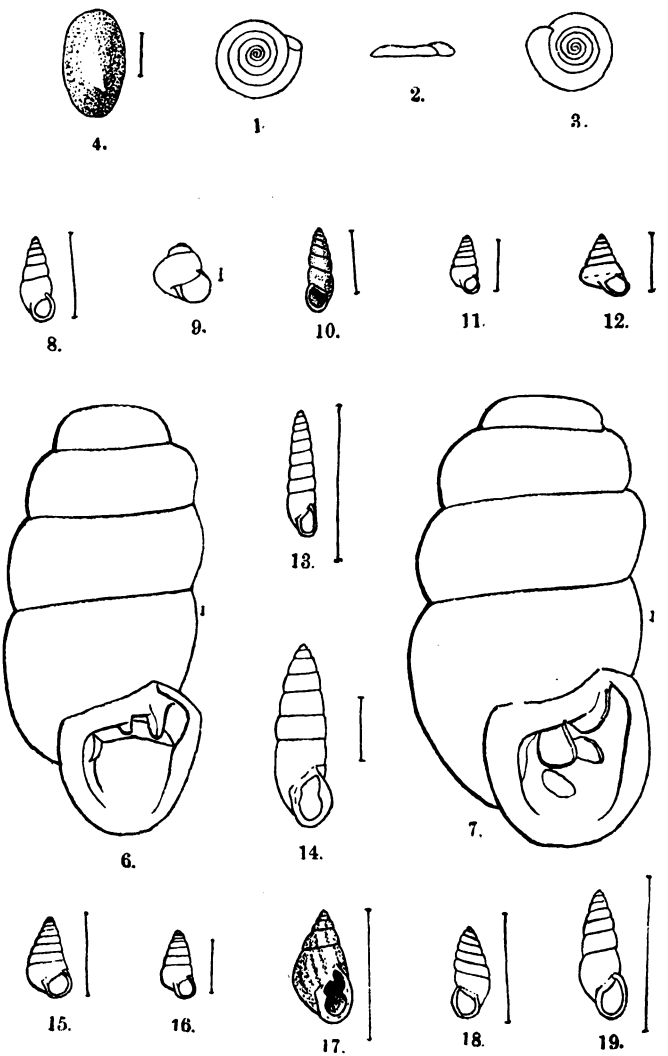

1, 2, 3, *P. cultratus.* 9, *P. cæca.* 15, *B. pinguis.*
4, *A. excentricus.* 10, *B. compressicollis.* 13, *B. proelongus.*
6, 7, *P. calamitosa.* 11, 16, *B. pinguis var.* 14, *B. geoffreyi.*
8, *B. armandi.* 12, " " *v. dilitatus.* 17, *P. radiata.*
18, *B. alboreflexus.* 19, *B. cantori, v. octonus.*

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EXCHANGES.

Litiopa striata from Sargasso Sea; Donax Cayennensis; denticulata; Macrocerramus Kinsteanus; lineatus var. (n. s.) Hayti; fine; Unio Canadensis, etc., etc., all my own collecting. Lists exchanged. J. J. BROWN, M. D., Sheboygan, Wis.

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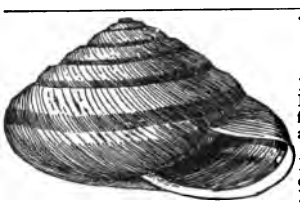

Helix (Aglaia) fidelis, Gray, Oregon.

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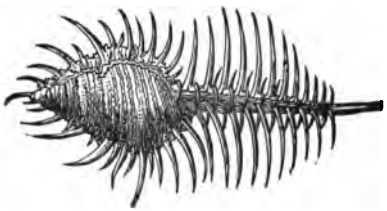

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THE NAUTILUS.

VOL. III. DECEMBER, 1889. No. 8

DESCRIPTION OF A NEW AMERICAN HELIX.

BY F. A. SAMPSON.

On the Boston Mountains, Crawford Co., Arkansas, I found some shells which may be described as follows:

Triodopsis edentata, n. sp.

Shell imperforate, depressed, with granulate striations, thickly covered with hair-like projections; whorls 5, the last strongly contracted at the aperture; suture not much impressed; spire short, obtuse; parietal wall with a long arcuated white tooth; umbilical region impressed; aperture contracted by a deep indentation behind the peristome; on the inner margin of the peristome are two enlargements or obsolete teeth, one near the base, the other midway between it and the right terminus of the peristome.

Greater diameter 13½, lesser 12, height 7 mill.

T. inflecta in Arkansas varies from 9 to 12 mill. diameter, and the larger shells in general appearance are very much like this species with the exception of the teeth on the peristome. Had I found but one or two specimens I would have taken them to be immature *inflecta* of large size, but I found a dozen living and dead shells the latter part of February, and they were all destitute of peristome teeth, and are as much entitled to specific distinction as *Triodopsis Rugeli* Schutt, in which the difference from *inflecta* is the distance of the upper tooth of the peristome within the aperture.

In this species the enlargements of the peristome correspond in position with the teeth of *inflecta*, but it is hardly proper to call

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them teeth, the thinner shells being as clear of teeth as a typical *Mesodon*, and only the old thickened shells have the obsolete teeth. They attain a size somewhat larger than the largest specimens of *inflecta* in the Binney collection.

Prof. Call believes them to be *Triodopsis appressa minor*, but they seem to me to be nearer *inflecta* than *appressa*, and if not a distinct species, they certainly are a well-marked variety.

NOTES ON THE VARIATION OF CERTAIN MOLLUSCA INTRODUCED FROM EUROPE.

BY T. D. A. COCKERELL.

As I have urged when writing of *Helix nemoralis*, few subjects can be more interesting to the conchologist than the effect of environment on species, which is seen so frequently in the case of variable species introduced into new countries.

Through the kindness of Mr. W. G. Binney and Prof. J. H. Morrison, I have been enabled to examine specimens of several species of European Mollusca introduced into this country, and to refer them to various varieties already known in Europe, but mostly so far not recognized in the American fauna.

(1.) **Agriolimax agrestis** (L.) var. **Sylvaticus.** (Moq., non Drap.)

This is the mottled form of the species, and appears to be the prevalent form at Burlington, New Jersey, whence Mr. Binney has sent me several living examples. One of these is unusually large, being 53 mill. long.

(2.) **A. agrestis** var. **typica.** (Less. & Poll.)

This is the spotless type, of which I found a single example at St. Thomas, Ontario, Canada, in 1887.

(3.) **A. agrestis** var. **reticulatus** (Moq.)

Resembles var. *sylvaticus*, but is reddish-ochre with black irregular spots, often tending to reticulation on the body. Sent from Burlington, N. J. (Mr. Binney).

(4.) **Limax (Lehmannia) variegatus** Drp. var. **flavus** Moq. (=**L. flavus** "L.," Auctt.)

Lexington, Va., one example from Prof. Morrison.

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(5.) **Limax maximus** "L.," Auctt., var. **vulgaris** Moq.

This has the dorsal black bands continuous. One from Lexington, Va. (Prof. Morrison).

(6.) **L. maximus** var. **cellarius** D'Argentville.

The bands on the back interrupted at intervals. Fifteen specimens, some tending toward var. *ferussaci* Moq., from Lexington, Va. (Prof. Morrison).

(7.) **L. maximus** var. **maculatus** Picard.

The back with black spots irregularly placed. One very nice one from Burlington, N. J. (Mr. Binney).

(8.) **Helix nemoralis** L.

Mr. Binney has sent me several living examples from Burlington, N. J., among which the var. *rubella* greatly preponderates, *guettardia* and *cuvieria* being the only other varieties represented. It is here interesting to notice, that at Burlington, where the species has been long established, it varies *much less* than at Lexington. The red forms so rare at Lexington, largely preponderate in the Burlington sendings.

Prof. Morrison has lately sent me several more varieties from Lexington, ten being new, and two already recorded in Europe. These latter are var. *requienia* Moq. (=*petiveria* 10345) and var. *libellula* 1(234)5 Kreglinger. The new ones will be recorded later.

(9.) **Helix hispida** var. **concinna** (Jeffreys).

Mr. Binney sent me a shell found at Montreal, referable to this form. It is pale horn color, max. diam. 8¾, alt. 4¾ mill. *H. concinna* was considered by Dr. Gwyn Jeffreys a valid species, but it cannot be separated on sufficient grounds from *H. hispida* L.

(10.) **Helix cantiana** Mont. var. **minor** Moq.

Mr. Binney has sent me an example which he received from Mr. F. R. Latchford, labelled "Citadel, Quebec, Aug. 12, 1886." It is smaller and thinner than the type, with the least tinge of red outside the outer lip. Max. diam. 15, alt. 10 mill. Figured in Bull. Mus. Comp. Zool. Vol. xiii, No. 2 (1886). Pl. I, fig. 13. This form, which I believe is very constant in its characters, is a variety of *Helix galloprovincialis* Dupuy, which, however, is itself undoubtedly a variety of *H. cantiana*.

West Cliff, Custer Co., Colo., Nov. 6, 1889.

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WHAT IS SPECIES?

BY CHARLES T. SIMPSON.

But while we are throwing stones at the 'new school' across the water, let us be sure that on this side we are not living in glass houses. Look at the 1200 species of Unionidæ; more than half of which we proudly claim to be residents of the waters of the United States! Look, too, at the vast number of names we apply to our Strepomatidæ, our Planorbis, Limnæas and Physas! There can be no doubt that the numbers of these genera, and perhaps those of our Zonites and Helices will be greatly cut down when the truth concerning them is at last revealed to us. How many species of shells have we, right here in our own country, which have been thoroughly and carefully studied; of which complete collections have been made of specimens of various ages throughout their range, and compared with anything like complete collections of allied forms? Very few indeed! I know that in the matter of naming we are all "prone to err as the sparks are to fly upwards." It is said that a naturalist has a horror of the unnamed, and I believe it. I know collectors, and good students too, who will not have unidentified specimens in their cabinets, and I confess that it makes me a little fidgety to have a shell that I cannot refer to anything. Those who collect get such things often, and when they refuse to agree with any figure or description, it is aggravating and then often no doubt the Father of Temptation puts it into their heads that they are new; and the thought of seeing their names in print attached to one of the works of nature, and the cheap glory that accompanies it stimulates them to name and send them out, when perhaps had their relations been carefully studied out, they would be found to be merely forms of something already well known. I cannot forbear in this place from quoting from a letter written by my friend, the late Miss Annie E. Law, one of the most careful and indefatigable students and collectors that has ever lived in this country. She says: "I want to tell you what an iconoclast I would be if I had a chance! I send you Eurycælon Wheatleyii which came from Mr. Wheatley himself. Now can you see any reason why Anculosa praerosa wouldn't be just as good a name? In the Holston and Clinch Rivers individuals of the same species seem to grow heavier, coarser, and generally larger as we go down stream.

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In the upper reaches we have Io fluviatilis, 100 miles lower down we have I. spinosa, I. turrita, and I. brevis. I have collected many thousands of these Io's: spinosa is the most abundant form; then, after picking out a few turrita and brevis there are always a large proportion that might fit one place as well as another; therefore I would call them all spinosa, more or less developed by local causes. Pleurocera sycamorense in one stream becomes P. estabrookii in another, and P. unicale in a third. Goniobasis sulcosa in a brook, becomes G. arachnoidea in a creek. Pleurocera parvum and P. Lyoni in a creek in the mountains, become P. fastigiatum in large streams. Dr. Lewis regarded Goniobasis livescens and G. niagarensis the same, and I don't see why Pleurocera curtum and P. conicum should need different names; and when it comes to the Strephobasis I don't want to name them." Such is the opinion of one who has spent many years of her life in exhaustive research and study among the Molluscs of Tennessee. And when a like thorough search and comparison of all the species of North America has been made I predict that there will be a wholesale addition to the list of our synonyms. No doubt in a number of the cases which Miss Law cites the difference between selected specimens was great enough to warrant separating them and giving them names, but the trouble was that intermediate forms of every degree were found, which completely connected them; and as in so many other cases this variation was produced by circumstances.

Now species founded on trivial characters, or those which insensibly merge into others cannot stand. I fully agree with my friend Dr. Singley of Giddings, Texas, who says that he wants species which he "can separate from others without the aid of a powerful magnifier and a vivid imagination."

A careful and earnest student from Kansas writes as follows: "I have lately collected a large number of Planorbis trivolvis from the rivers and creeks in this vicinity, and I find it a most interesting shell. I can take Binney's Land and Fresh-water shells of North America and a box of these and duplicate a half dozen species figured and described in it." And I believe the same will be found to be true of our Succineas which need a thorough pruning down in the matter of names.

And what is a variety? If species, as they are now recognized among conchologists, hopelessly run together, where shall the varieties appear? What is the difference between a variety and a species, is

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a question that I have often been asked ; in fact I have often made the same inquiry myself. When the Judge wanted to know of Sam. Weller whether he spelt his name with a V or a W he replied: "That depends on the taste and fancy of the speller." And I think that in applying specific or varietal names, much depends on the taste and fancy of the one giving them. I think a definition of a variety might be, a shell which evidently belongs to a given species but which presents certain constant minor variations from the type. Sometimes these may be color, or of size, form, sculpture; in the presence or absence of a tooth, or other detail, but it should always be constant to be worth anything, and even when it is, conchologists do not adhere to any strict rule in naming. Among the cones and olivas, coloring is often the principal distinguishing character; while with shells like Donax and many of the Neritas and Neritinas, it counts for nothing.

I believe that those of us who are more conservative should collect and study not with a view to the formation of new species, but to cut down and relegate to the synonymy the hundreds and perhaps thousands of false ones which already exist. Instead of making the inquiry over a puzzling form, isn't it new, it would be better to ask, doesn't it connect species that are now considered separate. Mr. Tryon gloriously inaugurated the work of cutting down the list of our names, and I believe that as great honor and fame awaits the iconoclast in the future, as can possibly belong to the most assiduous member of the new school of the present.

ON CREPIDULA GLAUCA.

BY JOHN FORD.

In his recently published Catalogue of the Marine Mollusks of the Southeastern coast of the United States, Dr. Dall appears to have altogether ignored the existence of Crepidula glauca, Say, the figure of the latter, taken from Gould's Invertebrata of Massachusetts, having been utilized by him to represent a juvenile C. fornicata, Say. The same mistake was made by my friend, the late Mr. Geo. W. Tryon, Jr., in one of his early publications, but a more recent examination of a large number of specimens satisfied him that the species was absolutely distinct from C. fornicata or any other species belonging to the genus.

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The writer's first knowledge of the characters of the two species certainly convinced him that they were widely separated, and in order that this fact might be made apparent to others, some fine suites of both forms were shown and commented upon at a recent meeting of the Phila. Acad. of Nat. Sciences, and, it may be added, that the conchologists present fully endorsed the views of the speaker.

The several prominent characters exhibited by C. fornicata are as follows:

1st, the *lateral* curve of the apex, which, though very prominent, is, as a rule, closely attached to the body of the shell.

2d, the bow-like curve of the free edge of the interior arch.

3d, the well-defined nick at the junction of the latter with the outer wall of the shell. 4th, the *concave* form of the septum, which is the same in all stages of growth.

Other characters might be noted, but those given will doubtless suffice to separate the species, as C. glauca has none of the features alluded to.

The apex of the latter species is quite small and comparatively free from contact with the body of the shell. It is also horn-like in appearance, usually shining, and but slightly inclined to curve laterally.

The free edge of the septum is straighter than that of C. fornicata, and the notch is not only absent but replaced by a slight advance of that part of the plate along and against the inner wall of the shell. Another, and perhaps the strongest character of the group is the *convex form of the septum.*

This feature, which is a constant one, may be safely depended on to distinguish the species at once from C. fornicata *in which the septum is always depressed.* The general outline of the shells will also help the student to divide the species, C. fornicata as a rule being pear-shaped, while C. glauca is usually disk or quoit-like in form. The prevailing color of the latter is also a distinguishing mark, the inside of the shells being of a dark brown color and the outside a dark gray or purple.

That a species so well marked as C. glauca should be dropped or merged into another without a given reason, is no small matter, and more than one student will doubtless thank the eminent Doctor for some explanation.

It may be of interest for some readers of the "Nautilus" to know that a very fine suite of the shells can be seen in the New Jersey

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collection of the Philadelphia Acad. of Nat. Sciences; also, that the writer, who has collected many scores of specimens, has never found them associated with any other species of the genus.

JOHN FORD.

Philadelphia, Pa., Dec. 12th, 1889.

THE SHELL-BEARING MOLLUSCA OF RHODE ISLAND.

BY HORACE F. CARPENTER.

FAMILY UNIONIDÆ.

This family formerly called Naides, embraces those shells commonly called fresh-water clams or mussels. They are found in rivers and ponds all over the world, but they reach their greatest perfection in this country. Over twelve hundred species are known to science, named and properly classified, of which more than half inhabit the U. S. This family has been made the special study of the late Dr. Isaac Lea, of Philadelphia, who died at the advanced age of ninety-five years, on the eighth of Dec., 1886. He devoted fifty years of his life to the study of the Unionidæ and has described more new species than all other conchologists together. He has read before scientific and other societies one hundred and fifty-seven papers and has been honored by degrees and honorary membership of twenty-five of the most prominent universities and scientific associations of the world. His great work, "Observations on the genus Unio" consists of thirteen quarto volumes, illustrated by hundreds of beautiful plates.

The shells of this family are not in general very attractive on the outside, but the interior of the valves are always lined with a beautiful pearly substance called nacre, which in some specimens are pure white and in others salmon, rose-red, blue, green, purple, etc. The sexes in this family are distinct, which is an exception to the rule in a large majority of the species of Mollusca, where the sexes are united in each individual. The shells exhibit but little variation in form except the usual one, that the females are more ventricose and broader behind than the males.

The animals of this family are all capable of producing pearls, some of which are of great beauty and value. In one instance sixteen pearls were obtained from a single specimen. One of the

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objects of Cæsar's expedition to Great Britain was to obtain pearls from the fresh-water clams of that country. The pearl fisheries of Scotland in the river Tay, were continued until the end of the last century and many large and beautiful pearls were found in the river Tyronne, in Ireland.

One of the finest of the English pearls is now in Queen Victoria's crown. Old and deformed specimens are the most liable to contain pearls, and they consist of a nucleus of some foreign substance such as a grain of sand, covered by successive layers of nacre secreted by the mantle of the animal. The color of the pearls varies with its species, and is of the same shade as the nacre which lines the interior of the valves.

In China the natives make little flat lead casts of their idols; these they insert between the shell and the mantle of the animal, by prying open the valves of these clams with a wedge; the presence of these foreign substances irritates the animal and causes it to deposit layer after layer of nacre upon them. After a time the shells are opened and the images removed and worn as charms.

This family is divided into six genera, three of which inhabit the U. S.: they are called Unio, Margaritana and Anodonta.

Genus *Unio*, Retzius, 1788.

Shell equivalve, multiform; hinge with a short, irregular, striated, simple or divided tooth in each valve, and an elongated, marginal tooth.

There are about one thousand species of this genus, nearly eight hundred of which are American and one hundred and fifty or more inhabit the Ohio river and its tributaries; only five of these are found in New England and but three inhabit R. I.

187.—*Unio complanatus*, Solander.

Syns.:

Mya complanata, Soland. and Dillw.
Union purpurens, Say, Desh. Barnes.
Union purpuraceus, Lam.
Union violaceus, Spengl.
Union fluviatiles, Green.
Union (Naia) complanatus, Perkins.

Shell elongated-oval; beaks at the anterior fourth, almost always eroded; surface coarsely wrinkled by the lines of growth, and

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covered with a thick tar-colored or very dark green epidermis; interior lined with a dark peach blossom nacre, sometimes salmon colored. There is a single, erect, pyramidal, coarsely striated cardinal tooth in the right valve, and two triangular, pyramidal teeth in the left valve; lateral teeth long, compressed and slightly curved. Length, 3½ inches; height, 2 inches; breadth, 1 inch.

This is our most common fresh-water clam. It is found in all the rivers in the U. S. which empty into the Atlantic Ocean, but is not found west of the Atlantic slope. It is also abundant in almost all the ponds east of the Allegheny mountains. It might be collected by bushels in the Blackstone River, Cunliff's Pond, Old Warwick Pond and many others. It is a favorite article of food for the muskrat, which devours them in great numbers, leaving piles of empty shells on the edges of the streams and ponds. It is a very curious thing how the muskrat can open the shell and devour the animal without leaving a mark of teeth or claw upon the shell. Specimens freshly cleaned of their contents are in as fine condition for the cabinet as those obtained alive and prepared on purpose, the two valves held together perfectly by the ligaments, and the edges or margins of the shell unbroken.

188.—*Unio nasutus*, Say.

Syns.:

Mya nasuta, Wood.
Eurynea nasuta, Stimp, Perkins, Morse, etc.
Unio rostratus, Valenc.
Unio nasutus, Say, Con. Lea, Gld. Dall, etc.

Shell slender, very inequilateral; beaks small, pointed and slightly elevated, posterior produced so as to form a snout, from which peculiarity its specific name. There are usually two or three radiating lines running from the beaks to the end of the snout. Surface smooth; epidermis glossy, of a dark olive-green color, becoming dusky in old specimens. Nacre silvery white, iridescent, sometimes with shades of bluish or salmon; cardinal teeth delicate, compressed and directed obliquely forwards; cavity of the beaks small. Length, 3 inches; height, 1¼ inches; breadth, ⅝ inch.

Described by Thos. Say in Nich. Ency. 1816. It is quite a common shell in the Middle and some of the Western States, but is very rare in New Eng. It has been found in only four localities in Mass.

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and in one in Conn., and after searching in vain for several years and having given up all hopes of finding it in R. I., I unexpectedly discovered a locality in the summer of 1871. In hunting for other species of shells in Cunliff's Pond at Elmville, in Cranston, I saw a few single valves of this species lying near the shore; knowing that if dead shells were on the bank, live ones must be in the pond, I went in, and succeeded in finding several splendid specimens of this rare and unique species.

GENERAL NOTES.

NEW AMERICAN SHELLS. The following species are described in a paper read before the Philadelphia Academy. *Pupa Sterkiana*, a cylindrical species, the shape of *P. muscorum*, but nearly as large as *armifera*, the mouth without teeth, surface strongly rib-striate, from Lower California. *Zonites selenitoides*, a Californian species, a little larger than *Z. minusculus*, ribbed like *Selenites duranti*. *Helix Streatori*, from Caymon Id., south of Cuba, allied to *H. gaussoini* Tryon, but more depressed, banded with chestnut color, and with more conical spire.—*Pilsbry.*

PŒCILOZONITES CIRCUMFIRMATUS var. CORNEUS. This is different from the typical form in lacking color-markings. Shell thin, fragile, horn-colored. The specimens were given me by the ABBE VATHELET, who collected them in Bermuda.—*Pilsbry.*

PUPA WANTED. The editor wishes to obtain specimens of *Pupa decora* Gld. for comparison with Western shells. A liberal exchange will be given.—*Pilsbry.*

LIMAX AGRESTIS IN PHILADELPHIA. I have just examined a series of 21 examples of this species collected in Philadelphia, Pa., and kindly sent to me by Mr. H. A. Pilsbry. So far as one can judge from alcoholic specimens, five color-varieties are represented. Two specimens appear white, and may be referred to var. *albidus*, Picard. Six are pale ochery, and spotless, and are referable to *typicus* Less. and Poll., but approach *rufescens* in their color. Six have very indistinct brownish marbling or reticulation, and may be classed under Moquin's var. *obscurus*. Five are var. *sylvaticus* Moq. (now Drap.), and two are to be regarded as V. *reticulatus*, although differing slightly from the description of that variety. One specimen

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has the mantle distinctly bifid anteriorly,—a very interesting malformation which I have not before seen.

T. D. A. COCKERELL.

West Cliff, Colorado, Dec. 7, 1889.

HYALINIA STERKII Dall, originally found near New Philadelphia (Tuscarawas Co.), Ohio, has also been collected in the Northeast (either Summit or Lake Co.) of the same state.—*Dr. Sterki.*

FOR THE EXAMINATION of small and minute species of *Hyalinia, Pupa, Vertigo,* etc., it is just the right thing to have everything collected in a locality mixed up; that will allow the best idea of the malacological character of a place.—*Dr. Sterki.*

PUPA HOLZINGERI, Sterki, proves to be widely distributed in the Northwest. Since the first few examples were known it has been collected in Will and LaSalle Counties, Illinois, by Mr. J. H. Ferriss, of Joliet, Ill. From Iowa, Nebraska and Dakota (Ft. Berthold), I found it in collections, under various names. From Minnesota I know of none after the first examples from Winona.—*Dr. Sterki.*

DR. DALL has recently proposed a new classification of the Bivalves, very different in some respects from the old arrangements founded on the number of muscles or gills. An abstract will appear in the January NAUTILUS.

AN INTERESTING little book has been received from Prof. R. E. C. Stearns, on "Ethno-Conchology; a study of Primitive money" (*Ex* Rep. U. S. Nat. Mus.). Romance and love, pearls, treasures, dashing Spanish cavaliers, and all manner of attractive things illuminate the earlier pages; from these the author descends to the more sordid and commonplace money-cowries, and to strings of purple and white wampum, Dentalium-money and Haliotis-money. It is all so interesting that we will not quote, but recommend the entire paper to our readers.

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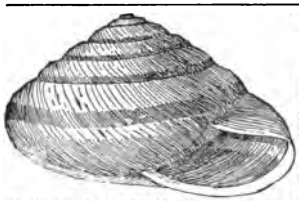

Helix (Aglaia) fidelis, Gray, Oregon.

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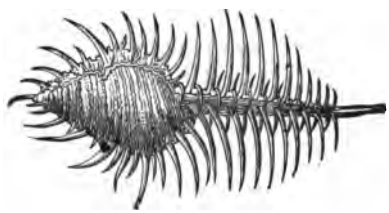

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THE NAUTILUS.

VOL. III. JANUARY, 1890. No. 9.

IN A MAINE CONCHOLOGIST'S HUNTING GROUNDS.

Next to the pleasure of being in a region which has not been scientifically explored, the student of natural history finds most delight in visiting a place where some shining luminary in his favorite branch has made his mark. There is the earnest resolve to find every species mentioned by the earlier scholar, and the tempting hope of something new. Such a spot is the beautiful town of Bethel, Me., the old stamping ground of Edward S. Morse. Those who have read his papers on the land and fresh water shells of Maine, on the land Mollusks of New England, and his more general articles on the Pupas and Vertigos, can but regret that the greater attractions of Japanese pottery and the lecture platform, drew him away from studies of conchology. For he is a man who goes deep into whatever subject he takes up, even the humble land snails no larger than radish seeds. It was at Bethel that Morse discovered the curious little Planogyra asteriscus, the lusterless steel-blue Zonites ferreus, and the tiny Vertigo ventricosa. I found the former abundant in a swampy place beneath some pine trees on the edge of the wide Androscoggin intervales, early in October. The layers of damp leaves were alive with many species of minute shells, Zonites milium and Z. Binneyanus, both Morse discoveries, were very rare, but Z. exiguus, Z. radiatulus, Z. fulvus, Patula lineata, Vertigo Gouldii, Pupa contracta and Carychium exiguum were plentiful. By taking up each dead leaf separately, a few brown specks were sometimes found, which a magnifying glass revealed as Punctum pygmaeum or minutissimum. In dryer places, beneath pieces of bark, and fallen trees were other tiny shells. Zonites ferreus, Patula striatella

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a single Patula harpa, Helix labyrinthica and Zonites arboreus. An old oak stump in the pasture was the hiding place of Helix monodon. Beneath fern roots in a clump of oak trees in the intervale I discovered Macrocyclis concava, Succinea obliqua and Vitrina limpida, perhaps the most slimy and difficult to handle of all shells, after being plunged into hot water previous to cleaning. Lastly, where the brook moistened the mossy rocks and the roots of the great beach trees, was the home of the plainly beautiful Helix albolabris. Only in one spot did I find the asteriscus. Perhaps Morse found his type specimens in that identical spot. Whether he did or not is immaterial, but he could hardly have found a better place, or experienced more pleasure in the discovery than I did.

It was Edward S. Morse who remarked that the multitude of intelligent young people who spend hours in the puzzle departments of magazines, and obtain simply an answer to clever word juggling, could find equally entertaining puzzles in Nature's book, the solving of which would bring more than mere words. They would find that the life history of natural objects had all the fascination of a well-written story—the turning of every page, arousing increased interest in what might follow.

Our young students of conchology should be induced to look among the little shells for new discoveries. Anybody can pick up Helix albolabris in its home, but only those who know what they are looking for can find Planogyra asteriscus. Let us see if the influence of Morse and his Bethel shells can be made to animate a new generation of pupils.

EDWARD W. ROPER.

NOTE ON CREPIDULA GLAUCA SAY.

BY W. H. DALL.

My friend, Mr. John Ford, raises the question of the omission of this alleged species from the list of Mollusks of our southeastern coast and asks for an explanation. In reply, I would say that the specimens named *C. glauca* by Stimpson and others among the older

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naturalists, which have come under my notice have all appeared to me to be referable to *C. fornicata* (L) Lam., or to the variety of *C. convexa* Say which has grown upon a broad, not very convex, or perhaps a partly concave surface. A fine series of shells from Cape May, submitted to me by Mr. Ford as *C. glauca* come under the latter category. They are distinct from *C. fornicata*, but they do not show the characters called for by Say's description, which in itself presents no features to distinguish the shell he describes from the young and spotted form of *C. fornicata*, to which I have no doubt it belonged. Such shells are in the National Museum labeled *C. glauca* by Stimpson. It may not be known to all our conchologists that the extremely high and usually dark-colored forms of *Crepidula*, such as *C. convexa* (typical) and *C. adunca* of California, derive their peculiar appearance from roosting on some gasteropod, and that wider and less elevated forms of the same species can almost always be found, if not in the same locality, at least in a geographical series of wide range. The difficulties, in the way of a satisfactory determination of such semi-parasitic forms as the *Calyptræidæ* are very great, and increase in my experience with the amount of material subjected to study. That there may be a distinct form entitled to be called *C. glauca* I do not wish positively to deny, but I must confess that I have never seen one and therefore have grave doubts of its existence.

A LIST OF THE MOLLUSCA OF COLORADO.

(Compiled for the Colorado Biological Association.)

BY T. D. A. COCKERELL.

In the "Journal of Conchology," vol. vi, pp. 60–65, I gave some preliminary remarks on the Mollusca of Colorado, stating that from the lack of records and other reasons, a complete list could not then be prepared. Since then a considerable amount of material and information has been gathered, and while much remains unknown, there is sufficient ascertained to seem to warrant the presentation of a faunal list. In this list the localities are not all given in detail, as

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it has been deemed unnecessary to repeat details of this kind which have been published elsewhere. Many species are considered by the author to be identical with those of Europe; some of these are considered distinct by good authorities, and pending sufficient anatomical comparisons, are retained as varieties. A distinction is also drawn between "forms" and "varieties."

LIMACIDÆ.

Agriolimax campestris var. *montanus* (Ing.), Grand Co. (Ingersoll), *Agriolimax* Mörch presents differences from *Limax* proper which are probably to be considered generic. *A. montanus* cannot be distinguished from *campestris* by external characters, and I do not think its anatomical ones warrant specific separation.

A. campestris montanus form *castaneus* (Ing.) Blue River Valley (Ingersoll). Probably only a young example of *montanus*, and certainly no better than a variety. Vide J. of Conch. V, 358.

A. campestris montanus form *typicus* Ckll. Custer Co.; Chaffee Co.; Saguache Co.; Fremont Co. (Canon City); Summit Co.; Eagle Co.; Mesa Co.; Gunnison Co.

A. campestris montanus form *intermedius* Ckll. Saguache Co.; Fremont Co. (Canon City); Pueblo Co. (Wales Canon); Custer Co. (Wet Mountain Valley); Summit Co.; Mesa Co.; Delta Co.

A. campestris montanus form *tristis* Ckll. Lake Co.; Summit Co.; Delta Co. A few specimens of *A. agrestis* and *Helix nemoralis*, from Burlington, New Jersey, have been liberated at West Cliff, Custer Co.

Vitrina pellucida var. *limpida* (Gould). White Earth River (Ingersoll); Dillon, Summit Co.; Swift Creek, Custer Co.; Grand Mesa, Mesa Co.; Wales Canon, Pueblo Co.; Cottonwood Gulch, Saguache Co.; near Mam Mts., Mesa Co.; West Fork of Surface Creek, Delta Co.; South Park (Yarrow).

V. pfeifferi Newc. Head of Gunnison River (Binney); San Juan Co. (Ingersoll); E. Fork Arkansas River, Lake Co.; near Cattle Creek, Garfield Co.; near Mam Mts., Mesa Co.; Breckenridge (Hy. Prime); Rock Creek, Routt Co.; Fort Garland (Yarrow); Twin Lakes (Yarrow).

Hyalina nitida (Müll.) High alpine (Carpenter), needs confirmation.

Hyalina arborea (Say). San Juan Co. (Ingersoll); Williams Canon, Manitou (M. E. Cusack); South Park (Yarrow); Twin

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Lakes (Yarrow); near West Cliff, Custer Co.; Micawber Mine, 10,000 feet, Custer County; Wales Canon, Pueblo County; Slate Creek, Summit Co.; Buzzard Creek, Mesa Co.; Black Lake Creek, Summit Co.; Chalk Creek, Chaffee Co.; Divide Creek, Garfield Co.; Plateau Creek, Mesa Co.; Kremmling, Grand Co.; near Egeria, Routt Co.

H. arborea form *viridula* Ckll. (Science Gossip, 1889, 257.) Horseshoe Bend Gulch, 10,000 ft., Custer Co., and other localities in the same district.

H. radiatula (Alder). Saguache Co. (Ingersoll); South Park (Yarrow). This is *electrina* Gld., but it may not be *viridula* Menke.

H. radiatula form *radiatula* (Alder). Pueblo Co.; Smith's Park, Custer Co.; Mesa Co.; near Cattle Creek, Garfield Co.

H. radiatula form *viridescenti-alba* (Jeffreys). Smith's Park, Custer Co.; Mesa Co.

H. minuscula (Binney). Mountains near Ft. Garland (Yarrow).

H. (*Conulus*) *fulva* var. *chersina* (Say). White Earth River (Ingersoll); South Park (Yarrow); Twin Lakes (Yarrow); near West Cliff, Custer Co.; Micawber Mine, 10,000 ft., Custer Co.; Pueblo Co.; Kremmling, Grand Co.; near Egeria, Routt Co.; Buzzard Creek, Mesa Co.; Surface Creek, Delta Co.; Divide Creek, Garfield Co.; Black Lake Creek, Summit Co. *H. chersina* seems to me a pure synonym of *fulva*, but Mr. Ancey regards it as probably distinct.

HELICIDÆ.

Patula strigosa (Gould). Grand R. (Binney); Gilpin Gulch (H. Prime); Blue River (Yarrow); Saguache (Yarrow).

Patula strigosa form *globosula* nov. Small, globose, dark above periphery with two bands, transverse grooved striæ rather well marked. Diam. 11½, alt. 8½ mill. Black Lake Creek, Summit Co. The specimen seems immature, but is remarkable as being the only form I have seen in Colorado that is nearer to *strigosa* than *Cooperi*. Is is doubtless allied to var. *Gouldi* Hemphill.

P. strigosa var. *Cooperi* W. G. Binney. Grand River (Binney); Blue River Valley (Ingersoll); Gilpin Gulch (H. Prime); Williams Canon, Manitou (M. E. Cusack); Morrison, Lyons, and St. Vrain Canon (A. Eastwood); Gunnison (E. W. Roper); Middle Park and North Park (Ingersoll); near Durango (A. Eastwood); Micawber Mine, Custer Co.; Kremmling, Grand Co.; Egeria,

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Routt Co.; Pueblo Co. (R. Cusack); Hardscrabble Canon, Custer Co.; Black Lake Creek, Summit Co.; Pottery Pass, about 11,500 feet, Summit Co.; Red Cliff, Eagle Co.; near Glenwood Springs, Garfield Co.; near Buzzard Creek, Mesa Co.; Surface Creek, Delta Co.; near White Earth Creek, Gunnison Co.

P. strigosa cooperi form *typica* Ckll. Canon City (T. Morgan); Cave of the Winds, Manitou (E. W. Roper), and many other localities.

P. strigosa cooperi form *trifasciata* Ckll. Mesa Co.

P. strigosa cooperi form *confluens* Ckll. West Mountain Valley, Custer Co.; Garfield Co.; Mesa Co.

P. strigosa cooperi form *elevata* Ckll. Delta Co.

P. strigosa cooperi var. *depressa* nov. Shell flattish, max. diam. 21⅓, alt. 12½ mill. Specimens of this variety were sent to me by Miss A. Eastwood, who found them in a canon near Durango. The same variety is figured by Binney, Man. Amer. Land Shells (1885), p. 166, fig. 153.

P. strigosa cooperi form *major* nov. Shell with diam. 25 mill. Near head of North Mam Creek, Mesa Co., Sept. 14, 1887.

P. strigosa cooperi var. *minor* Ckll. Near Egeria, Routt Co., abundant. It is quite a distinct local race.

P. strigosa var. *hemphilli* (Newc.) Williams Canon, Manitou (Binney). This perhaps requires confirmation. The examples of *strigosa* I have seen from Williams Canon are ordinary *cooperi*. The young of *cooperi* is keeled.

P. striatella (Anth.) Twin Lakes and South Park (Yarrow); Este's Park (Binney); Grand Co. (Ingersoll); Gilpin Gulch (H. Prime); Williams Canon, Manitou (M. E. Cusack); Swift Creek, Custer Co.; Kremmling, Grand Co.; Rock Creek, Routt Co.; Powderhorn, Gunnison Co.; Divide Creek and near Cattle Creek, Garfield Co.; Buzzard Creek, Mesa Co.; Black Lake Creek, Summit Co.

P. striatella form *albina* (Morse). Near Mam Mts., Mesa Co Differs from the type in having a white shell.

P. ruderata var. *cronkhitei* (Newc.) Blue River Valley (Ingersoll); Cottonwood Gulch, Saguache Co.; Micawber Mine, Chester Co.

P. ruderata cronkhitei form *viridula* nov. Shell greenish-white. Micawber Mine, Custer Co.

P. ruderata var. *gorktschana* Mouss. Ouray Co. (Binney).

P. (Punctum) pygmæa var. *minutissima* (Lea). Willow Creek,

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Custer Co. I doubt whether *minutissima* is separable even as a variety from *pygmæa*.

P. (*Punctum*) *conspecta* (Bland.) San Juan Co. (Ingersoll).

P. (*Thysanophora*) *ingersolli* (Bland). San Juan Co. (Ingersoll); near Brush Creek, 10,000 ft., Custer Co.; Clearwater Creek, Grand Mesa, Mesa Co. A species of high altitudes.

P. (*Helicodiscus*) *lineata* (Say). Animas Valley (Ingersoll).

Helix (*Stenotrema*) *monodon* Rack. Colorado Springs (Yarrow). Beyond this record, nothing is known of any species of the group in Colorado. Probably the Colorado Springs *H. monodon* was introduced by human agency.

H. (*Vallonia*) *pulchella* var. *costata* (Müll.) San Juan Co. (Ingersoll); South Park (Yarrow); Micawber Mine, Custer Co.; Rock Creek, Routt Co.; Kremmling, Grand Co.; Pueblo Co.; near Salida, Chaffee Co.; Black Lake Creek, Summit Co.; Buzzard Creek, Mesa Co.; near Cattle Creek, Garfield Co. Perhaps *costata* deserves to rank as a species distinct from *pulchella*.

H. pulchella costata form *cyclophorella* (Ancey). The ribs in this form are close and delicate, but it seems to me referable to *costata*. Mr. Ancey has identified a specimen from West Mountain Valley as *cyclophorella*, and indeed, if the name is to be adopted, it will probably include at least a majority if not all of the Colorado specimens of *Vallonia*. Vide 11th Rept. Colo. Biol. Assn. (1889).

H. pulchella pulchella Müll. Binney records *pulchella* from Este's Park, but it is probable that the form was *costata*.

West Cliff, Custer Co., Colorado, Dec. 10, 1889.

AN ANNOTATED LIST OF THE SHELLS OF ST. AUGUSTINE, FLA.

BY C. W. JOHNSON.

The following is a list of the shells which came under my observation while living at St. Augustine from 1881–88.

As very little dredging was done it is probably far from complete, but as some of the notes may be of interest to the Conchologist, I herewith submit it to the readers of the Nautilus.

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Octopus rugosus Bosc. A few which are evidently this species, one large specimen is preserved in alcohol.

Argonauta argo L. Occasionally a shell is found after a storm.

Loligo pealii Lesueur. Quite common.

Ommastrephes bartramii Lesueur. One specimen, probably this species, is preserved in alcohol in a private collection.

Spirula peronii Lam. The internal spiral shells are common among the debris after storms.

Murex spinicostata Valenc. Living examples are rare. I have seen but three. By the numbers found in the shell mounds and fields it seems to have formally been quite plentiful and a special object of capture among the aborigines.

Urosalpinx cinereus Say. Common on oysters.

Eupleura caudata Say. A few specimens.

Purpura hæmastoma L. *var. floridana* Cour. Common on the old light-house rocks. It varies greatly in form. I have specimens varying from those without a shoulder or tubercles on the body-whorl, to those that are shouldered and bearing two prominent rows of tubercles.

Purpura hæmastoma L. *var. undata* Lam. A few specimens found with the above.

Fasciolaria distans Lam. I think that this is distinct from F. tulipa L. The specimens collected here show no intermediate form. It seems to have a more limited distribution. I do not remember seeing any in the southern part of Florida, and among the quantities of shells brought from the Bahamas I never observed one, though F. tulipa L., is quite common. A color variety is occasionally found here in which the maculations and revolving lines are reddish-yellow to pink.

Fasciolaria tulipa Linn. Not common.

Fasciolaria gigantea Kien. Several specimens. I found a living specimen in the harbor nearly two feet in length.

Fulgur carica Gmel. Common and quite destructive to the oysters.

Fulgur carica Gmel. *var. eliceans* Mont. Thick and gibbous, with fewer and larger spines, occasionally a double row of spines on the shoulder of the whorls. More plentiful than the typical.

Fulgur perversa Linn. Common and some unusually large specimens.

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Fulgur canaliculata Say. Not common, and smaller than those from more northern localities.

Fulgur pyrum Dillw. Not common.

Nassa vibex Say. Common on the sand bars between tides.

Nassa acuta Say. Rare. I doubt whether this is the same as N. ambigua Mont. This was the most common gasteropod in a deposit of shell brought up from forty feet below the surface in sinking the well of the Ponce de Leon Hotel.

Nassa obsoleta Say. Common on the mud between tides.

Nassa trivittata Say. A few on the ocean beach usually sea worn.

Marginella apicina Menke. A few sea-worn specimens.

Olivella mutica Say. Common on Bird Island beach.

Olivella mutica Say *var. nitidula* Dillw. More plentiful than the typical.

Oliva litterata Lam. Common. The specimens found here are longer and more cylindrical than those from the Gulf coast.

GENERAL NOTES.

ARION FOLIOLATUS GOULD, REDISCOVERED. You may announce in your Journal, if you wish, that Hemphill has sent one living *Arion foliolatus* Gld., from Olympia, Washington. One big fellow is over four inches long. It agrees perfectly with Gould's description and figures, though not quite so deep a red as the latter. It has the internal plate of *Prolepis*. The caudal mucus "pit" is, very plainly seen. Jaw with over 22 ribs, wide, low, scarcely arcuate.—W. G. BINNEY, *In letter to Ed.*

LIMAX HEWSTONI COOPER IN LOS ANGELES COUNTY. In "Nomenclature and Check-list of North American Land Shells," the *Limax Hewstoni* is not quoted south of San Francisco. I have often found a shelless snail at this place and these have been identified by Dr. J. G. Cooper of California as the *Limax (Amalia) Hewstoni*.—M. BURTON, *Williamson University, Los Angeles County, California.*

KANSAS SHELLS. I have identified the following species of Land Shells from Sedgwick County, Kansas: *Pupa contracta, corticaria, armifera, rupicola; fallax, Hyalina indentata* and *arborea; Helico-*

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discus lineatus, Strobila labyrinthica, Vallonia pulchella var. *costata, Limax campestris* and *Bulimulus dealbatus*, also *Pupa fallax* and *rupicola* from Kingman County, 60 miles west of Wichita. Is it in any way remarkable to find so many species of Eastern and Southeastern Shells so far West and North of this?—FRANK J. FORD, *Wichita, Kansas, in letter to Ed.*

CREPIDULA GLAUCA *vs.* C. CONVEXA. In the discussion of these Crepidulas the fact seems to have been lost sight of that if identical (as I have no reason to dispute) the name *glauca* has precedence over *convexa* in the original paper by Say in the Journal of the Academy of Natural Sciences of Philadelphia. The names would stand thus: *C. glauca* Say for the type form, and *C. glauca* var. *convexa* Say, for the high rounded form, if it be considered of even varietal importance.—*H. A. P.*

SCALARIA of the New Jersey Coast. Under the name of *S. angulata* there have been included two species by most authors and collectors. These have been separated and the differential characters pointed out by Dr. Dall, in his great work on the 'Blake' Mollusks, who proposes for the more slender, elongated one the name *Scala sayana*. This very form is, however, the true *S. humphreysii* of Kiener, described and figured many years ago. The synonymy of the two forms has become so confused that I give it below in systematic order.

Scala angulata Say.

S. clathrus var. *angulata* Say, Amer. Conchol., pl. 27, two upper figures.

S. angulata Say, Sowerby in Thes. Conch., I, p. 86, pl. 32, fig. 5, 1847; and in Conch. Iconica, vol. XIX, fig. 14.

S. angulata Say, Tryon in Amer. Marine Conchol., p. 77, fig. 140 (bad); and in Manual of Conchology, vol. IX, p. 70.

S. angulata Say, Dall in Bull. U. S. Nat. Mus. No. 37, p. 122.

Scala humphreysii Kiener.

S. humphreysii Kiener in Species et Icon. Coquilles Vivantes, *Scalaria*, p. 15, pl. 5, fig. 16.

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S. lineata Gould in Invert. of Mass., Binney's edit., fig. 580, but not description.

S. sayana Dall, Report on Blake Gasteropoda, p. 309; and Bull. U. S. Nat. Mus. No. 37, p. 123, pl. 50, fig. 10.

The mistake of considering *S. humphreysii* a synonym originated with Sowerby. By blunder it is quoted "*humphreysiana*" in the Conchologia Iconica, and Tryon evidently followed that work instead of the original in the Manual of Conchology. To Dr. Dall belongs the credit of discriminating the species from *S. angulata*, and I regret the necessity which compels me to place the name he proposed in the synonymy. *S. humphreysii* is more plentiful than the real *S. angulata* on the Southern New Jersey Coast.—*H. A. P.*

TEETH OF SNAILS. The Editor has recently received from Miss Anna Goodsell, Poughkeepsie, N. Y., a number of beautifully mounted radulæ of Western Mollusks. If conchologists who possess microscopes of even very moderate powers will examine these beautiful structures they cannot but become interested in them. Odontophores of numerous Western species can be obtained of Miss Goodsell.—*P.*

PUBLICATIONS RECEIVED.

ON THE LINGUAL DENTITION AND SYSTEMATIC OF PYRGULA by C. E. Beecher. (*Ex.* Jour. N. Y. Micros. Soc.) The dentition of this interesting genus for many years a desideratum is figured and its character discussed by Mr. Beecher. He concludes that *Pyrgula* is most nearly allied to the *Melanians*. The true position of the genus seems to us to be with *Baicalia* and its subgroups, *Micromelania* and a few other small groups, which agree in having no basal denticles to the central teeth. The entire anatomy, the shells, and the radula (apart from this one character of lacking basal denticles) is that of *Amnicola* and other fresh-water rissoids, not at all like *Melania*. Dr. Fischer has already included *Baicalia* in the *Hydrobiidæ* as a subfamily, *Baicaliinæ*. I would enlarge his subfamily to include not only *Baicalia* and its sections, but also *Pyrgula* and *Micromelania*. The

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North and South American so-called *Pyrgula* belong to *Pyrgulopsis* Call and Pilsbry and *Lyrodes* Döring, and group with *Amnicola*.—*P.*

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The proprietors wish to state that beginning with the February number, the young readers of THE NAUTILUS will be provided with an

AMATEUR'S CORNER

in which the rudiments of Conchology will be taught, illustrations of well-known shells given, scientific terms explained, and any other information given which will be of interest to young collectors. Prof. Josiah Keep, author of that popular book "West Coast Shells," Dr. V. Sterki and others have promised to contribute articles to this department, and we look forward to a good time in our renewed search for "Shell Knowledge" in company with you.

We would state that together with the Latin terms used we will give the common names of shells when they have any.

H. A. P. & W. D. A.

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EXCHANGES.

Offered.—Unio alatus, Say, plicatus, Leseuer, fragosus, Con., trigonus, Lea; Marg. complanata, Say, and many others, for marine shells. JOSEPH ANDERSON, Box 1955, Muskegon, Mich.

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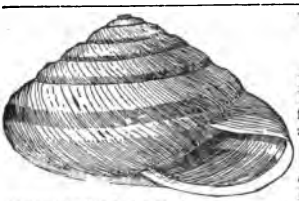

Helix (Aglaia) fidelis, Gray, Oregon.

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By PROF. JOSIAH KEEP, Mills College, California.

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OF CONCHOLOGISTS.

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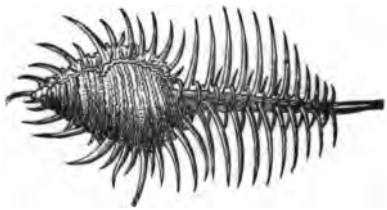

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THE NAUTILUS.

VOL. III. FEBRUARY, 1890. No. 10.

COLLECTING LAND SHELLS IN EASTERN NEW YORK.

BY W. S. TEATON.

Near the east shore of the Hudson, midway between Tivoli and Barrytown, in Duchess Co., New York, is Cruger's Island. It has an area of seventy-five acres, and is so richly endowed with beauties and attractions—nature's gifts, which the owners have carefully fostered—that to the visitor it seems a place of enchantment. The scenery is especially fine; an almost undisturbed view for miles up and down the "Rhine of America," with the majestic Catskills some ten miles distant to the west, a beautiful background to the picture; while from its many winding paths are ever-changing vistas of water, mountain and sky.

At the northeast a large stream, the White Clay Kill, rushes down the rocks through a romantic glen and has its outlet. South of this, for a long distance, fringing the east shore of the cave, and having a width varying from an eighth to a half mile, is an extent of heavily-wooded land of perhaps two hundred acres, part of a park-like domain of Revolutionary days called "Almont." The soil is of decided clayey character, and there are a half dozen little rivulets coming from the hills at the east running through to the river. With their numerous tributary branches they have cut their way down through the plastic earth making quite an intricate succession of deep gullies.

Here are hundreds of grand, massive white oaks, beeches, and hickories, growing so thickly as to almost shut out a glimpse of the

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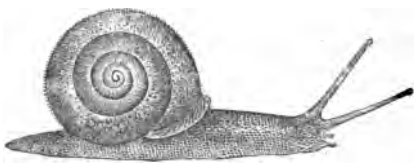
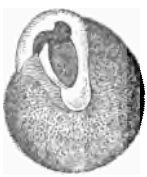
sky. It is a scene of primitive sylvan grandeur not often found in this part of the country. Great numbers of fallen trees and decaying logs are lying in every ravine, and the ground is thickly carpeted with leaves. It is thus an ideal home for the land snails, which flourish in abundance, and a "happy hunting ground" for the enthusiastic collector, who, if he pays it a visit during a warm, humid day of summer—just after a shower for instance, when everything among the trees is saturated, and the air is smoking with moisture—will find the woods literally teeming with Molluscan life.

Helix albolabris.



H. palliata.

The writer on one such day carried home actually two quarts of splendid live specimens in his pockets, besides having filled all his collecting boxes. They speedily became quite a slimy mass, not conducing in any great degree to personal comfort, but who among the Nautilus people could resist a like temptation?



H. palliata.

At such a time an abundance of *Helix albolabris*, large and beautiful, and *H. thyroides*, crawling about the logs, and traveling among the leaves; plentiful supplies of *H. alternata* and *palliata*, but keeping nearer at home; ocasionally a *Zonites fuliginosus*,—a very pretty shell when perfect; many of *H. tridentata*; *H. monodon* (*fraterna*), and *hirsuta* to be had on closer search among the stones in the vicinity of the falls; while down at the river's edge, on the rushes and weeds, are thousands of *Succinea ovalis*, and associated with them though in greatly lessened proportion, is an elongated form of *S. avara* of dark amber color, some individuals of which are found reaching 11 millimeters in length.

Patula alternata.

(*To be continued.*)

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NEW WESTERN SLUGS.

BY T. D. A. COCKERELL.

Prophysaon pacificum Cockerell, n. sp.

Length (in alcohol) 17½ mill. Body and mantle ochery-brown, head and neck gray. Mantle granulated, rather broad, with a black band on each side not reaching the anterior border; these bands are furthest (2¼ mill.) apart near the respiratory orifice, from which point they converge posteriorly, and anteriorly by the bending of the band on the right side. Length of mantle 7¾ mill., breadth 4 mill. Respiratory orifice 3¼ mill. from anterior border. Body cylindrical, rounded and very blunt at end, not conspicuously tapering. Distance from posterior end of mantle to end of body, 8 mill. Body dark grayish-ochre above, with an indistinct pale dorsal line; sides paler. Reticulation distinct, with indistinct "foliations." Sole somewhat transversely wrinkled, but not differentiated into tracts. Jaw dark, strongly curved, blunt at ends, with about 10 well-marked ribs. Lingual membrane, with about 35-1-35 teeth; centrals tricuspid, the side cusps very small, laterals bicuspid, marginals with a large sharp straight point, and a small outer one. Compared with *P. humile* the centrals are slightly shorter and broader. Liver dark gray-brown.

Found by Mr. H. F. Wickham under logs in ditches by the roadside and damp places at Victoria, Vancouver Island, 1889.

This is a very distinct species, easily recognized by its color, the absence of dark bands on the body, the pale dorsal line, and the blunt posterior extremity.

Prophysaon flavum Cockerell, n. sp.

Length (in alcohol) 25 mill. Body and mantle dull ochreous, head and neck ochreous. Mantle tuberculate-granulose, grayish-ochre, pale at edges, and with black marbling or spots in place of the bands of *P. pacificum*. Length of mantle 11 mill., breadth 5½ mill. Respiratory orifice 5 mill. from anterior border. Body cylindrical, hardly tapering, and blunt at end. Distance from posterior end of mantle to end of body, 14 mill. Body dark grayish-ochre above, with a pale ochreous dorsal line not reaching much more than half its length; sides paler. Reticulations distinct, "foliated." Sole with well-marked transverse lines or grooves, those of either side

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meeting in a longitudinal median groove, which divides the foot into two portions. Liver pale grayish. "Uniform tawny as is *Limax flavus*. It stretches itself out in a worm-like shape unlike other species. Internal shell plate, jaw and tongue as in *Andersoni*." (W. G. Binney.)

Gray's Harbor, Washington. (Hemphill, 1889.)

This is probably a variety of *P. pacificum*.

Prophysaon cœruleum, n. sp.

Length (in alcohol) 22½ mill., in motion, 43 mill. Body and mantle clear blue-gray, paler at sides, sole white. Mantle finely granulated, broad, without markings. Length of mantle 7 mill., breadth 5 mill. Respiratory orifice 2½ mill. from anterior border. Body subcylindrical, tapering, pointed. (In one specimen eaten off at the end.) Distance from posterior end of mantle to end of body, 10¾ mill.

The reticulations take the form of longitudinal equidistant lines, occasionally joined by transverse lines, or coalescing. Sole not differentiated into tracts. Jaw pale, strongly ribbed. Liver white. Mr. Binney sends me colored drawings of the living animal; the neck is long and white, or very pale. Mr. Binney has examined the jaw and lingual, and finds them as usual in the genus. Several specimens were sent from Olympia, Washington Ter., from Mr. Hemphill to Mr. Binney.

P. cœruleum is an exceedingly distinct species, distinguished at once by it color and the character of its reticulations.

Prophysaon cœruleum var. **dubium** n. var.

Length (in alcohol) 8 mill. Length of mantle 4 mill. Distance from posterior end of mantle to end of body 3½ mill. Mantle broad, with four bands composed of coalesced black marbling, very irregular in shape, and running together anteriorly. Body dark, tapering. Sole pale, its edges gray. Liver white.

With the *P. cœruleum* is a small dark slug, probably a variety of it, but differing as described above. It will easily be distinguished by its blackish color and the peculiar markings on the mantle.

Prophysaon humile Cockerell, n. sp.

Length (in alcohol) 16½ mill. Body above and mantle smoke-color, obscured by bands. Mantle wrinkled, and having a broad dorsal and two lateral blackish bands, reducing the ground-color to two obscure pale subdorsal bands. Length of mantle 7 mill., breadth

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5½ mill. Respiratory orifice 2¾ mill. from anterior border. Body subcylindrical, somewhat tapering, rather blunt at end. Distance from posterior end of mantle to end of body 8 mill. Back with a blackish band reaching a little more than half its length, and lateral darker blackish bands reaching its whole length. Reticulations distinct, "foliated." Sole strongly transversely striate-grooved, but not differentiated into tracts. Jaw pale, strongly striate, moderately curved, not ribbed. Lingual membrane long and narrow. Teeth about 35-1-35. Centrals tricuspid, laterals bicuspid, marginals with a large point, and one (sometimes two) small outer points. Liver pale chocolate.

Found by Mr. A. F. Wickham under the bark of rotten logs in the woods around Lake Cœur d'Alene, Idaho, 1889.

In its reticulations, and general external characters, this species resembles *P. andersoni*, of which it is possibly a variety.

OCCURRENCE OF HELICINA OCCULTA SAY, IN BROWN CO., WIS.

BY GEO. T. MARSTON.

My first knowledge of the occurrence of this mollusk in Brown County, was in the spring of 1886, when I found a single "dead shell" on the shore of Fox river about two miles south of DePere.

Again, on May 13, 1888, I found five (5) specimens, all alive, upon the banks of a small creek which, rising in a limestone ridge about a mile from where the specimens were procured and about three miles east of DePere, flows into East or Devil River and eventually into Green Bay.

The shells were found, within a space of 300 feet, along the banks of this creek, the land above and below this being under cultivation. They were isolated and were obtained only after careful search, myself and an assistant going over the place frequently.

A week later when another search was made, and in the spring of 1889, no specimens could be found.

The little tract inhabited by this shell is very rich in land and fresh water mollusks, and seems to be a favorite resort of Helicodiscus lineata, which lives there in great numbers.

Green Bay, Wis., January 28, 1890.

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ANNOTATED LIST OF THE SHELLS OF ST. AUGUSTINE, FLA.

BY C. W. JOHNSON.

Crepidula glauca Say. I think there is no doubt but that C. glauca and C. convexa are the same species—their form depending on the object upon which they have grown. But I doubt whether they are varieties of *C. fornicata.* In the series before me the following characters seem to distinguish them from the typical young of *C. fornicata.* Apex distant from the margin, septum thinner and less depressed.

Crepidula unguiformis Lam. Common.

Crepidula aculeata Gmel. Not common.

Scala angulata Say. Common.

Scala humphreyii Kiener. Common.

Scala multistriata Say. One specimen.

Scala turricula Sowb. Not common.

Scala lineata Say. Not common.

Ianthina fragilis Lam. A few after a storm.

Vermetus spiratus Phil. var. *radicula* Stimp. A few on the ocean beach.

Turbonilla areolata Ver. One specimen.

Odostomia impressa Say. Common on oysters.

Columbella lunata Say. Common upon sea weed.

Columbella avara Say. Common.

Cancellaria reticulata. A few sea-worn specimens.

Terebra dislocata Say. Common on the sand bars in the harbor.

Clathurella plicata C. B. Ad. Common among oysters.

Daphnella cerina Kurtz & Stimp. Common among the wash of small shells on the ocean beach.

Strombus pugilus Linn. A few sea-worn specimens. I have never seen a trace of *Strombus costatus* Gmel., in this locality. Bahama specimens are common in the shell stores. I have specimens from Lake Worth, Fla. (250 miles south).

Trivia pediculus Linn. Several sea-worn specimens.

Ovula uniplicatum Sowb. Common on the Leptogorgia virgulata, a species of Gorgonia. As this varies in color (orange, yellow, white and purple), the shells to a great extent partake of the color of the Gorgonia on which they live.

Ovula gibbosa Linn. One living specimen on the Leptorgia.

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Cassis cameo Stimp. One sea-worn specimen on the ocean beach.

Semicassis sulcosus Brug. var. *inflata* Shaw. Rare.

Dolium galea Linn. Several broken shells. *D. perdix* is not found here.

Pyrula papyratia Say. A few sea-worn specimens.

Natica pusilla Say. Common.

Natica duplicata Say. Common.

Sigaretus perspectivus Say. Not common.

Sigaretus maculata Say. Rare. I believe that this is identical with *S. Martinianus* Phill., of the West Indies. The only apparent difference is that the revolving brown bands of *S. martinianus* are irregularly divided into *maculations* by broad longitudinal lines which usually represent rest periods in the growth of the shell and are frequently on *S. martinianus.*

Pyramidella conica C. B. Ad. Several specimens.

Littorina irrorata Say. Common.

Littoria scabra L. var. *lineata* Gmel. Common on the sea wall but much smaller than those from the southern part of the State.

Cerithium atratum Born. Common around Marsh Island.

Cerithidea scalariformis Say. Common along the marshes west of the city.

Cerithiopsis greenii C. B. Ad. Common.

Cerithiopsis terebralis C. B. Ad. Common.

Triforis nigrocinctus C. B. Ad. Common.

(*To be continued.*)

A WORD TO YOUNG COLLECTORS.

BY JOSIAH KEEP.

We ought to feel a great veneration for the men who have gone before us, and who spent so much time and strength in preparing the way for those who were to follow. Whenever we take up the label of a shell and see the abbreviation "Linn." following the specific name, how it carries our thoughts back to the great Swedish naturalist who did so much to simplify the nomenclature and enlarge the domain of science.

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And as we cannot exercise feelings of veneration and gratitude for mere names of unknown persons, it is well for us to become somewhat acquainted with the lives of the great naturalists whose initials meet us whenever we glance over our collections. For some of us, perhaps, this is not an easy task; but fortunately books and papers upon these subjects are becoming more common, and it is much easier now to obtain this information than it was a few years ago. Such names as Say and Gould and Binney, for instance, while they serve primarily to identify the terms which these authors applied to their species, may themselves be studied and identified; and as we learn more of their pure and earnest lives, we shall have a deeper respect and a more profound veneration for the men who studied and wrote before we were born, and who left us the fruits of their labors. Veneration for character and admiration for attainments are healthful feelings, and their free exercise speaks well for the youthful mind.

And not only for the dead, but also for the living naturalists we should cherish these feelings, and seek for information concerning their lives. Many of them in their youth experienced the same perplexities and encountered the same difficulties which beset some of us now, and as we learn of their victories we may be encouraged to more vigorous action.

But while we entertain these sentiments of respect and esteem for both the past and the present workers in science, it is well to remember two things.

First. The men and women who are to be eminent in science forty years hence are boys and girls now. Each year adds to the list of the honored dead. A few, like the venerable Isaac Lea, spend nearly a century among the scenes of their labors and pleasures; but others, like the lamented Tryon, are cut down suddenly, in the midst of active vitality. The ranks are being recruited, it is true, but the recruits must ever come from the young.

Second. Truth is greater than any of its expounders. While it is desirable to know the names which eminent men have given to the various species of mollusks which we collect, it is still more important to know their nature, their habits, their food, stages of growth, and changes, and to observe their motions and conditions of activity or repose. Where we cannot observe the living animal, we can at least study the shell, and notice its points of resemblance to others, also its differences; we can examine its structure, test its composition, note

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its variation in different specimens, and endeavor to find out for ourselves its prevailing form and characteristics.

It may be that our investigations will lead us to conclusions differing from those which are commonly held; in which case we have a right to modestly hold and express them, until the uncertain points are settled.

Finally, the motives which should induce us to study and collect shells are varied; but among them may be mentioned the laudable desire to possess a series of objects which are of great beauty, both in outline and in color; next, the wish to learn the form, nature, and habits of the creatures which belong to one of the great sub-kingdoms of the animate world; then an endeavor to study the questions relating to the real meaning of the terms genus, species, and variety; how far they are natural and how far artificial; and lastly, to study modern mollusks so that we may be fitted to understand and interpret the numerous fossil shells which figure so extensively in the geological records of this grand old planet.

NOTES ON SOME NORTHERN PUPIDAE WITH DESCRIPTION OF A NEW SPECIES.

BY. DR. V. STERKI.

Of late, I have received, from a number conchologists in different parts of the country, many valuable Pupidae, partly sent for examination or determination, partly in exchange or cheerfully given for my collection, which now contains about 375 lots (of N. Am. Pupidae). But I need many more, especially of some difficult and doubtful species and groups, for a thorough study of this family. A part of these newer acquisitions are of so much importance, either systematically, or in habits, that a few notes about them may be welcome to the student of our malacological fauna. The latter becomes more and more interesting, as our knowledge of the distribution of the species is widening and their varieties and local forms are more numerous. But also new species have been found, and more doubtless will follow, as was and is to be expected from the immense area of our country, of which only a small part has been thoroughly investigated as to these little creatures.

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Some species and groups are omitted here, although I have received highly valuable materials of them, partly because they need being studied further, partly as I intend to treat them separately.

Pupa fallax Say.

This species has been collected, in typical form, on Curacao (Mazyck Coll), a fact which may prove, that P. modica Gld. is not only a southern form of fallax.

Pupa arizonensis.

The shells sent out under this name by Gabb, or at least most of them, are known to be nothing else than P. fallax, e. g., those in Smithsonian Inst. Coll., in Coll. of the Acad. of Philadelphia. When I found nothing else, in several of the richer private collections, I also began thinking that *P. arizonensis* was nothing else than a synonym of *fallax*, in spite of the description and even more the figure in Binney's work, which seemed to point to something of another kind. But since I have seen the (only) type specimen of that fig. in B. & B. Coll. (Central Park Mus., N. Y.), I know that there is really such a thing as *P. arizonensis* existing. The specimen is somewhat weathered, somewhat grayish-white, the epiconch lost—so that the original color cannot be determined exactly—but otherwise in good condition. It is best compared with *P. corticaria*, of the same shape, but larger (alt. 3, 5 m.), has no trace of lamellæ, and a thickened lip. Now, a short time ago, I received, by the kindness of Mr. L. B. Elliott, of Iowa City, a few examples of this same species. They had been collected, as Mr. E. writes, "at Siligman, Arizona, by an entomological friend, in the nests of large and fierce ants, used as materials to build the nests." They were also somewhat weathered, but fair. And again Mr. Elliott sent me a number of Pupidae, collected at Albuquerque, New Mexico, highly valuable things, among which there were 2 examples of our species, in the same condition. One of the Arizona specimens still bears its epiconch and the color is a pale horn; all have rather fine, remote, rib-like striæ, more crowded near the aperture.

A controversy may arise about the name: Whether Gabb has seen this shell, is not sure, but very improbable; his own description[1]—not to speak of the originals mentioned above—doubtless refers not to this species, but a form of *P. fallax*, not differing even as a var. from the type. On the other hand there is no doubt but that the descrip-

[1] 7 Am Journ. Conch. II, p. 331, Oct. 1, 1866, pl. 21, f. 6.

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tion and figure in Binney's work represent this species, and consequently are the first authentic publication. Thus, in my opinion, we have to write: *P. arizonensis* Binney.

Pupa holzingeri Sterki.

This species has a very wide range of distribution in the northwest and west. I found 2 exa. among Pupidae from Helena, Mont., sent by Mr. T. B. Elliott, and one in the lot already mentioned from Albuquerque, N. M., not much different from Illinois exa. In this regard it seems to resemble its relatives, *P. contracta* and also *armifera* which are remarkably constant all over the country, while some other species show a decided variability even in the same place.

Pupa curvidens Gould.

From my studies, during about 5 years, of my own exa. (22 lots of *curvidens* 34 of *pentodon* from all over the country) and a good many other collections, altogether thousands of specimens, I became satisfied that this species is to be taken up and separated from *P. pentodon* Say. It is smaller, almost always more slender, and the whorls are more slowly increasing, so that the last is relatively smaller and less predominating than in *pentodon*. Quite generally, there is, on the palatal wall near the aperture, a marked crest, and behind that an impression, deepest at the place of the inferior palatal lamella. The lamellæ are nearly the same in both, and decidedly variable as to their number (except the typical, apertural, columellar, basal and the two palatals) but by far more so in *curvidens* than in *pentodon*.

A marked difference is in the station of the two. While *pentodon* prefers low, moist localities, in company of Vertigo ovata, most Hyalinias, the tumid, smooth form of Carychium (exiguum Say), *curvidens* is found more in "upland" places, even on banks, steep slopes, together with Vert. bollesiana Morse, Hyalinia exigna Stimpson and the slender, regularly striated Carychium, where rarely or never a Vertigo ovata will be found. It is our commonest Pupa, here and in other parts of Ohio. P. cincinnatensis Judge is identical with it.

On a gravelly bank at New Philadelphia there is a peculiar form of our species; long, slender, nearly cylindrical, with only 5 typical lamellæ, no accessory ones; the color is somewhat greenish, and in weathered specimens not so white as in the type. The same form has been collected at Sewanee, Tenn., by Mr. Sanderson Smith, with

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the common, or typical, form; and it probably will be found elsewhere. It is so characteristic that I thought it not out of the way to name it *var. gracilis.*

P. curvidens is found nearly everywhere east of the Rocky Mountains, but it seems to go not quite so far west and north as pentodon does.

(*To be continued.*)

GENERAL NOTES.

A party of naturalists from the Academy of Natural Sciences of Philadelphia sailed from New York on the 16th of February, for Yucatan and Southern Mexico. Extensive collections of plants, mollusks, birds, insects, etc., will be made, and volcanic and other geological phenomena studied. Prof. Heilprin, Messrs. Stone, Ives, Baker and Leboutillier make up the *personnel* of the party.

We are indebted for the illustrations in this number of the NAUTILUS to Dr. W. D. HARTMAN, of West Chester, Pa., author of the excellent little book, "Conchologia Cestrica,"—now becoming scarce—and of numerous papers on *Partula* and *Achatinella.* Some months ago we had the pleasure of going over the Doctor's collection of these beautiful shells. In completeness it is certainly one of the first rank, surpassing, probably, any other collection of these two genera. In *Helicina, Melania* and South Sea Helices it is also very rich.

Prof. H. A. WARD, of Rochester, N. Y., spent a few hours with us recently. During the past year Prof. Ward has collected extensively on the West Coast of South America and visited the Exposition at Paris.

WANTED.—Correspondents interested in Corbiculidae. Also Helices of Cumberland subregion. Offered: *Limnaea Adelinae, Glyptostoma Newberryanum, Lucapina crenulata, Monoceros panciliratum,* etc. EDWARD W. ROPER, Revere, Mass.

ERRATA.—In the January NAUTILUS the following corrections should be made:

p. 102, 10th line from top, for "West" read "Wet."

p. 102, 5th line from bottom, for "Chester" read "Custer."

p. 103, 20th line from top, for "West" read "Wet."

A blunder also occurs in the name of Mr. M. Burton Williamson, University P. O., Cal.

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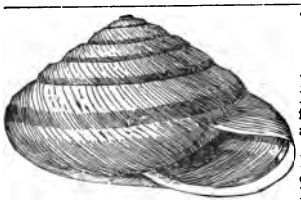

Helix (Aglaia) fidelis, Gray, Oregon.

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Vol. III. MARCH, 1890. No. 11.

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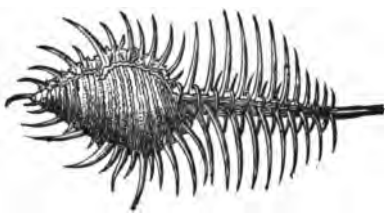

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THE NAUTILUS.

VOL. III. MARCH, 1890. No. 11.

ON A NEW SPECIES OF TYLODINA

BY WM. H. DALL.

In my Report on the Blake Gasteropods I have (p. 60, pl. xiv, figs. 9, 10) described and figured a shell, which, in the absence of the soft parts, I was obliged to refer doubtfully to the young of *Umbraculum* or *Tylodina*, under the head of "*Umbraculum bermudense* Mörch?"

This shell now proves to be a genuine *Tylodina*, different from the species of the Mediterranean or of California, and which may take the name of *T. americana*. The shell which was well figured as above, in life has a membranous extension 3–5mm. wide around the margin, continuous with the epidermis. The latter is smooth and pale with radiating broad purplish rays of color. The animal is much smaller than that of *T. Rafinesqui* in proportion to the shell, which abundantly covers it, and it emits a dark purple dye. It does not seem to differ essentially in the superficial characters of its soft parts from the species of the Mediterranean, which, however, has not been very well figured. The gill is attached to the edge of mantle on the right side. The other characters are much as stated in H. & A. Adams' generic description of the genus (Gen. Rec. Moll. II, 42).

The Blake specimen was obtained off Havana, dead, in 80 fathoms. The present specimen was obtained on the northern border of the Gulf of Mexico by the U. S. Fish Commission at Station 2406, in 26 fathoms, coarse sand and broken coral, on the line between the mouth of the Mississippi River and Cedar Keys, Florida.

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This enables us to add this interesting genus to the fauna of the United States. At a more convenient season I hope to describe and figure the soft parts and dentition, but at present can only notify the conchological world of its discovery and identification.

A NEW AMERICAN BULIMULUS.

BY H. A. PILSBRY.

Some weeks since Mr. Averell, Business Manager of the NAUTILUS, placed in my hands examples of a *Bulimulus* differing notably from all other American species, and which, in his opinion, was new. Upon writing to Mr. G. H. Ragsdale, of Gainesville, Texas, from whom the first specimens were obtained, I received six more in addition to Mr. Averell's. I propose for the new form the name BULIMULUS RAGSDALEI. It is about the size and form of *B. schiedeanus mooreanus* W. G. B., but rather more slender and elevated. The surface is not smooth, as in other American Bulimuli, but strongly ribbed-striate longitudinally. The apex is blunt; outer lip thickened within; columella reflexed over the narrow but open umbilicus. The aperture is less than half the entire height of shell. Whorls 6½.

Alt. 22, diam. 10 mill.; alt. of aperture 10½, diam. 7 mill.

Color, brownish corneous, somewhat translucent, the riblets opaque white.

Mr. W. G. Binney writes as follows of the specimens submitted to him:

"There is in my mind no doubt of their deserving a specific name—unless, indeed, you are in possession of examples showing a gradual change from the usual sculpturing to these ribs. It is not often one gets so interesting a form to describe! Is it not nearer to *dealbatus* than *Schiedeanus?*"

No specimens showing a transition to *B. dealbatus* or *schiedeanus* were found; nor have I ever seen any, although I have collected thousands of *Bulimuli* in Texas and examined many hundreds more collected by Singley, Sampson and others, from Kansas and Arkansas to the Rio Grande. Mr. Ragsdale writes me the circumstances of its finding as follows:

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"I send by this mail more of the *Bulimulus* you ask about; they are all dead shells. I could find no living ones; and have found these only in Cook and Montague Counties, Texas, *at the top* of the Red River Bluff, associated with the small shell (*Helicina orbiculata*) inclosed. The large *Helix* inclosed (*H. roemeri*) was at the foot of Bluff in the Red River Bottom. The *Bulimulus* was discovered by myself one mile north of St. Jo, Texas, in 1888, and again at the lower end of Warren's Bend, 25 miles N. W. of Gainesville, Texas, December 28, 1889."

An illustration will be given later.

ON SOME NORTHERN PUPIDÆ, WITH DESCRIPTIONS OF NEW SPECIES.

BY DR. V. STERKI.

Pupa pentodon, Say.

Not very much is to be added to the foregoing. It may be said, that this species is not so generally found with such a pure glassy shell, as curvidens when fresh and living, but more or less opaque or spermaceti white. It is decidedly variable in size and also in shape, being shorter, and more tumid or conical, in decidedly wet localities. I have a specimen from Helena, Mont. (Mr. Elliott), and several from Ottawa, Ont. and Winnipeg, Manitoba (sent by Mr. Geo. W. Taylor). Those from the latter locality are long and slender with a very strong callus inside of the parietal wall, in which the lamellæ are in appearance nearly buried.

Pupa Pilsbryana n. sp.

Among a few examples of the smaller form of "Pupa hordacea Gabb" now described by Mr. Pilsbry as *hordeacella* from Arizona, in Mr. W. G. Mazyck's collection, there was one specimen of an evidently new species, well formed and mature, and fresh although dead. Possibly there are more such in lots of the species mentioned above and sent out by Gabb. A few days ago among Pupidæ from Albuquerque I found 4 examples, although somewhat different, evidently being of the same species, which consequently is confirmed. Known from the region of the Rio Grande del Norte, and that of the Colorado River, and being doubtless distinct from all the species described, it is to be brought to general knowledge under a new name,

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for which I propose that of Mr. Pilsbry, the active student of our Pupidæ, to whom I am indebted for a number of valuable specimens and facilities to examine such.

Description: Shell minute, narrowly perforate, cylindrical-oblong to cylindrical, somewhat attenuated towards the rather blunt apex, colorless (when fresh glassy) with a very delicate bluish tint, smooth and polished, with few, irregular, microscopic striæ which are more marked near the aperture. Whorls 4½–5½ moderately rounded with a rather deep suture especially in the upper half, regularly and slowly increasing, the embryonal being relatively large, the last somewhat ascending toward the aperture; the latter of moderate size, lateral, subovate, margins approached, peristome somewhat expanded without a thickened lip or a callus in the palatal wall; outside is a barely perceptible trace of a crest near the margin and behind that a slight impression most marked upon the inferior palatal fold. Lamellæ 4 or 5; one apertural, rather high of moderate length, simple; one columellar, horizontal, of moderate size, simple; basal very small or wanting; palatals the typical, inferior deeper seated, of moderate size, superior small or very small.

Alt. 1.5–1.7; diam. 0.8–0.9mm.

There is a slight variation; the example from New Mexico being of lesser diameter, and having no trace of a basal lamella.

The soft parts have not been seen so far, but will be of high interest, since, to judge from the shell, our species seems to be an intermediate form between the hordeacella, etc., group, and P. curvidens, especially its var. gracilis.

P. Pilsbryana has much resemblance in shape and size to small, albino examples of *P. hordeacella* Pilsb., but, under a glass, is at once distinguished by the shorter, simple apertural lamella not ending at or very near the upper termination of the palatal margin, as it is in hordeacella, and by the smooth surface; the fine bluish hue may also be a distinguishing character if it prove constant.

Vertigo (?) variolosa Gould.

So far as I know, no specimen of this species from the continent is existing now in collections, that or those in the B. & B. collection having been lost sometime; but in the same, among a number of *P. contracta* Say, from Jamaica, one has been detected lately. Mr. Henry Moores of Columbus, Ohio, has had one example from Cuba, collected some 35 years ago by John Bartlett, and he was kind enough to lend it to me. It is more conical than in the figure and there are two

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lamellæ in the palatal wall, yet there is hardly a doubt but that it represents Gould's species. Messrs. Geo. W. & P. B. Webster took much pains, last fall and winter, on their trips in eastern Florida, to secure specimens, but so far did not succeed. Whoever visits the Peninsula should look after it.

From the whole configuration and especially the lamellæ, variolosa appears to be a Vertigo.

Vertigo gouldii Binn.

The true *V. gouldii*[1] has been collected at Helena, Mont., by Mr. I. B. Elliott, and at Ottawa, Ont., by Mr. Geo. W. Taylor; from the latter place in 2 somewhat differing forms. To mention it here, my *V. callosa* has not been found South of New York, nor west of middle Ohio, so far, to my knowledge, and among hundreds of small Pupidæ collected in Northeastern Ohio, by Mr. A. Pettingell, there was no example of that species.

Vertigo binneyana Sterki.

When this species was first published,[2] I had only 2 examples from Helena, Mont., and 2 from Winnipeg, Manitoba, but was satisfied that it is a distinct form Since then I have seen 2 from Glendive, Mont., and one from Albuquerque, N. Mex., the latter differing somewhat from the northern example, but unmistakably ranging with them. Thus it seems to live in the whole region of the western mountains.

Vertigo bollesiana Morse.

Specimens have been collected at Sewanee, Tenn., the most southern habitat on the continent I know of, by Mr. Sanderson Smith. But a short time ago I saw, in a number of *P. servilis* Gld., from St. Croix, W. I., one example of this species, with rather strong lamellæ. Whether it was collected with its companions or later accidently mixed in, is hardly to be decided otherwise than by other specimens brought from the West Indies.

The species is variable. Most examples from New York, Ohio, etc., are of good size, regularly striate, and of chestnut color, while those from New England and Canada are generally smaller, lighter in color and scarcely striate or nearly smooth; the inferior columellar (or "basal") lamella is sometimes quite small or even wanting. A peculiarity of

[1] Sterki, four new Vertigo sp. in Proc. Acad. Phila., 1890.

[2] L. c.

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this species is a very small, nodule-like supra-apertural lamella; but by no means constant, very often just a trace or entirely wanting. In its European equivalent, *V. substriata* Jeffr., this lamella is well formed and constant.

ON THE GENERIC POSITION OF ARION FOLIOLATUS, GOULD.

BY T. D. A. COCKERELL.

After remaining unknown and almost mythical for nearly forty years, the *Arion foliolatus* of Gould has been rediscovered by Mr. Henry Hemphill, in Washington Territory. Specimens were sent to Mr. W. G. Binney, which had been found near Gray's Harbor and at Olympia, and which are referable to two different forms, as follows:

Arion foliolatus Gould, type. One specimen agreeing with Gould's description and figure, from Olympia.

Arion foliolatus var. *hemphilli* W. G. Binney. Six specimens from Chehalis River, near Gray's Harbor. These slugs are described by Mr. Binney as "Bright yellow with bluish-black foot and edge of foot; reticulations dark reddish fawn." The genitalia also differ in some details from the type, but this may be partly due to a different degree of maturity.

Mr. Binney has kindly sent me the internal shell, genitalia, and skin of the typical example, as well as drawings of both, and copious notes, and at his request I offer a few remarks on the generic position of the species.

From the material I have examined, I should certainly have regarded the slug as a *Prophysaon* with affinities to *P. hemphilli.* But the Olympia example has lost the end of its body,[1] and the

[1] Mr. Hemphill, in his letter to Mr. Binney, relates of this example:—"When I found the specimen I noticed a constriction about one-third of the distance between the end of the tail and the mantle. I placed the specimen in a box with wet moss and leaves, where it remained for 24 hours. When I opened the box to examine the specimen I found I had two specimens instead of one. Upon examination of both I found my large *Prophysaon* had cut off his own tail, at the place where I noticed the constriction, and I was further surprised to find the severed tail piece possessed as much vitality as the other part of the animal. The ends of both parts at the point of separation were drawn in as if they were undergoing a healing process." When the box containing the slug reached Mr. Binney, the tail-piece was decomposed.

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special generic character, the caudal mucus pore, is lost. This, however, undoubtedly existed, for it is indicated in Gould's description, and Mr. Binney informs me that it is present in the examples of var. *hemphilli* from the banks of Chehalis River. Hence the slug cannot be a *Prophysaon*, and the question arises, is it an *Arion?* From the peculiar reticulation, the position of the genital orifice, the shape of the penis-sac, and the general character of all its parts, I think we may safely say that it cannot be placed in *Arion*, nor does it agree with any other described genus. We have therefore no option but to propose a new generic name for it.

Phenacarion[1] **n. g.**

Animal limaciform, tapering, resembling a *Prophysaon*, but possessing a caudal mucus pore or pit. Respiratory orifice on right anterior side of mantle, about one-third of its length from the anterior border. The mantle conceals a thin and subrudimentary calcareous plate, easily fractured. The sole is not differentiated into parts. Genital orifice behind right tentacle. Jaw with numerous ribs. Penis sac elongate, cylindrical, thick, not tapering.

The mantle of *Phenacarion foliolatus* is quite long, with the shell situated near the respiratory orifice. There are black markings and spots as figured by Gould. The body has large elongate or irregular reticulations, the interspaces being minutely reticulated to give the foliated effect on which the specific name was based. The edge of the foot has dark transverse lines, alternating with paler lines, much as in *Arion ater*. The sole is transversely and somewhat obliquely grooved, but there is no separate locomotive disc. The jaw has about 23 ribs, denticulating either margin. The genitalia are much like *Prophysaon*, and decidedly different from *Arion*. The testicle (ovotestis) is somewhat subdivided. The vas deferens enters at the end of the penis sac.

Mr. Binney's notes concerning the typical *P. foliolatus* give "general color of animal reddish-fawn, also of reticulations. On the lower edge of the mantle, along the back from end of mantle to tail, and above the edge of the foot, is a lighter band, and also on top of neck almost to base of tentacles. The light band on edge of mantle is irregularly speckled with reddish dots. Mantle minutely tuberculated. The oblique perpendicular lines on edge of foot alternate wide and narrow."

[1] phénax=an impostor; Arion.

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Phenacarion might almost be a variety of *Prophysaon hemphilli*, except for the generic character. Possibly Prof. E. D. Cope would regard this as an instance of "the same specific form" existing "though a succession of genera," which he has regarded as probable in his "Origin of the Fittest" (quoted by Wallace, "Darwinism," p. 421). Indeed, it not very rarely happens that almost the only difference between two species is a generic one. Good instances of this are afforded among the *Hymenoptera*, e. g., the resemblance of *Vipio coloradensis* Ashm., to *Agathis vulgaris* Cress., is almost exact on superficial examination. Except the generic and family characters, the *Agathis* is only a little larger with entirely fuscous wings, and the posterior femora and tibiæ mostly orange—peculiarities which might elsewhere be varietal only.

NOTE.—Mr. Cockerell writes me that he now regards *Phenacarion* as a subgenus of *Prophysaon*.—Ed.

A FEW LAST WORDS ON CREPIDULA.

BY JOHN FORD.

In my article on *Crepidula* published in the 8th number of the NAUTILUS, I endeavored to show that the shells described by Say as *C. glauca* were altogether distinct from the *C. fornicata* of Linné, and therefore the name should have been retained in Bulletin No. 30 of the National Museum recently published by Dr. Dall, instead of discarded. As in the following number their distinctness from *fornicata* was acknowledged by Dr. Dall, no further evidence seems necessary to sustain it.

The assertion by him however in the same issue, that the series of shells presented by me to the National Museum under the name of *C. glauca* "are distinct from *C. fornicata* but that they do not show the characters called for by Say's description," does, perhaps, challenge further remark; since it appears to be partly correct and partly conjectural. They are certainly not *C. fornicata*, but they as certainly do embody every character called for by Say's description of the true *C. glauca* written in 1821–2, and published in Vol. 2, Journal of the Academy of Natural Sciences of Philadelphia; also in Say's Conchology of the United States.

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It is possible, as Dr. Dall asserts, that the series in question are depressed specimens of *C. convexa*;—the extreme convex form of which he supposes to be caused by growing on the rounded surfaces of small univalves, but I do not think it at all probable.

Quite a number of those in my own collection were taken from small univalves but they are precisely the same in character as the series alluded to, and, like them, are labeled *C. glauca*, Say. As a matter of fact the peculiarly arched forms known as *C. convexa* are very rare on our immediate coasts, while those described as *C. glauca* are comparatively plentiful.

Why should there be this disparity in numbers? It surely cannot be for the want of those "roosting conditions" so needful to the growth of *C. convexa*, since it is well known that the small univalves of our region greatly outnumber the large ones.

Though many hundreds of the former have been examined by me I have never seen a *C. convexa* upon them. I have also scanned every available point on the New Jersey coast scores of times within the last twenty-five years, and during all of that period have secured but six specimens (all dead), corresponding to Say's description of *C. convexa.*

This fact of course proves nothing; nevertheless, until further evidence to the contrary is adduced I shall deem it prudent to consider them two distinct and well-marked species.

Should they, however, eventually prove to be the same, even then, as my friend, Mr. H. A. Pilsbry, has stated, the name *C. glauca*, having precedence over *C. convexa* in Say's original paper, must always stand for the type form, and be entitled therefore to a "place of honor" in all monographs of the genus.

Young Collectors' Department.

COLLECTING LAND SHELLS IN EASTERN NEW YORK.

BY W. S. TEATOR.

(Continued from February No.)

More careful hunting under the logs will bring to light good specimens of *Zonites arboreus, indentatus,* and *viridulus;* the last two rather scarce. Also a few *Zonites fulvus, H. labyrinthica* and

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pulchella, and *Pupa contracta;* but they are more partial to swampy situations, and with other small species are found in great numbers in certain places farther back in the country. Just one dead shell of *nitidus* has been taken—near the water, and it would seem to be a splendid locality for them. The *albolabris* is worthy of special mention on account of the superior size to which they attain: very seldom are they less than 30 mill. in diameter, while one shell measures 36. The *H. palliata* also are very perfect.

From the lower end of these woods to the 'Vly' is but a short distance; a long narrow strip of woodland lies on the north side of the causeway and forms the entire south shore of the cove. Here the conditions are much different; the ground is not over a foot or two above the high tides, and portions of it are occasionally inundated. The soil is of rich black mould with clay substratum, and has produced a dense growth of trees, principally elm; and a luxurious, almost tropical, undergrowth of shrubbery, ferns, and weeds.

Here lives and flourishes a colony of *Succinea obliqua* that is peculiarly interesting. During the warm months, May, June, July and August, they are wonderfully abundant. After the rains they are swarming over everything; feeding on the decaying rubbish, crawling on the weeds and bushes, going up the trunks of trees, and disporting themselves generally as if they really enjoyed their existence. Sometimes I have observed eighteen or twenty large fellows gathered around the foot of a tree as if on the point of a forward march of ascension. They never go very high however; I have not noticed them beyond five or six feet from the ground. Nor do they confine their attention to the woods; for in an adjacent large meadow many of them may be found traveling in the deep grass, some as much as a third of a mile away on the hillsides. So congenial are all the conditions surrounding them that they grow to surprising proportions; the best shells average 24 to 25 millimeters, often exceeding this. I have recently obtained one that is 28 mill. long. Mr. Pilsbry, to whom I sent a few specimens, says of them, "they are simply phenomenal in size." Mr. Binney tells me one rarely meets such large ones. The greatest length he mentions in his Manual of American Land Shells is 25 mill. Toward the latter part of summer the older ones die off rapidly, and late in the fall very few of them can be seen—but some of course survive the winter, while plenty of young will be left in the field for another year, which

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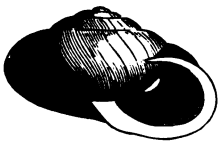
hibernate so carefully that one is amazed when spring opens to find such armies of them.

Living along with *Succineæ* are *H. thyroides* and *alternata;* shells of the former quite pretty, some of them delicate pink color, and a number of specimens are encircled with two or three bands of white, seemingly eroded. *Macrocylis concava* and *Zonites fulvus* also occur. *Pupæ* are scarce; I have only seen a few *contracta* and *pentodon.* In the wettest parts of the woods, in the moss, great numbers of *Pomatiopsis lapidaria* can be gathered; also *Carychium exiguum;* and in the cove and river in the near vicinity are twenty or more species of fresh water shells, many of them of excellent quality.



H. thyroides.

During the early part of the present winter, as frosty days were quite the exception, I visited "Almont" frequently for collecting, all of them delightfully successful trips. Have gleaned much of interest regarding the hibernation of the different snails there found. Here are my notes for the 7th of January this year:

Selenites concava.

"Particularly numerous at this time are *H. palliata,* though not so easily found as in summer. They are invariably closed with the epiphragm, lying aperture upward, looking very pretty when first exposed to the light, their pearly white lips contrasting beautifully with the dark epidermis. Old bark nests seem to be a favorite place for them to congregate for winter. Sometimes they will be found singly, often five or six grouped together; and at times as many as twenty or thirty distributed about a single little vicinity. A situation of this sort is often chosen by *H. monodon* (*fraterna*); this species can thus be found to the extent of twenty or more individuals in a cluster wintering along with *H. palliata.* Once in a while the collector is pleased by the finding of a large *Zonites fuliginosus* buried his whole depth in the ground, and nothing visible save the membranous covering over the aperture. *H. albolabris,* usually so plentiful in the warm season is now apparently very scarce; not over a half dozen live ones found this winter, and they were among the leaves, partially imbedded. In another wood near here the boys while raking

Z. fuliginosus.

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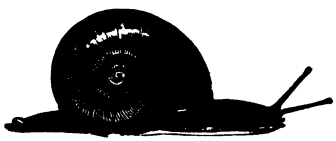
leaves late last fall obtained for me about one hundred specimens hibernating in the same way. *H. thyroides* at this time is occasionally gotten here and more especially at the 'Vly,' mostly buried in the earth. In a few instances I find the animal out and crawling, observed them to-day, and on the 26th of December. A cluster of very well-developed *fulvus* was obtained on the latter date under stones near tide water. A goodly quantity of *S. ovalis* was gathered a while ago, among and attached to broken rushes between the tides (dormant); but their number has greatly decreased since last summer."

Thus the region is more than doubly interesting to the conchologist, and it is one of the fields to which I have given considerable attention.



Z. fuliginosus.

GENERAL NOTES.

The party of scientists in Mexico from the Academy of Natural Sciences of Philadelphia are now in the neighborhood of Vera Cruz. When last heard from they were about to make an ascent of the volcano of Orizaba; after which they will travel inland.

I find *Helix clausa* abundant in vacant lots within the city limits of St. Louis. Found a dozen last summer clinging to leaves of elder berry bushes (*Sambucus canadensis*) at a height of six feet or more from the ground.—G. D. LIND, St. Louis, Mo.

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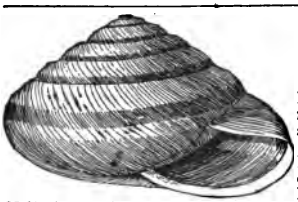

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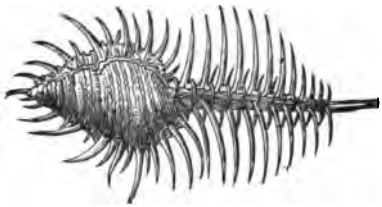

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DESCRIPTIONS OF NEW VARIETIES OF NORTH AMERICAN LAND SHELLS.

BY HENRY HEMPHILL.

(1.) **Patula strigosa** Gld. var. **subcarinata.**

The shell in general form resembles a large coarse elevated or depressed Cooperi. It has six whorls, well rounded above and beneath, and subcarinated at the periphery. The body whorl has two revolving dark bands, one above and the other below the periphery; sometimes the upper band spreads over the shell to the suture forming a dark chestnut zone that fades out as it passes toward the apex. The lip is simple, thickened, its terminations joined by a callus; aperture obliquely subangulate; the suture is well impressed.

Height of the largest specimen 1 inch, breadth 1½ inch.

Height of the smallest specimen ¾ inch, breadth 1 inch.

Habitat, Rathdrum, Idaho.

(2.) **Patula strigosa** Gld. var. **bicolor.**

This shell is a colored variety of the above.

It may be characterized as being of a general dark horn color mingled with dirty white; there are occasional zones of dark horn color above and fine dark lines beneath, but no defined bands. In some of the specimens the light color prevails, in others the horn color spreads over the shell in irregular patches.

Height ⅞ inch, breadth 1⅛ inch.

Habitat, Rathdrum, Idaho.

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(3.) **Patula strigosa** Gld. var. **lactea.**

This is a beautiful clear milk-white shell, with 5½ whorls, subcarinated at the periphery. In the elevated forms the aperture is nearly circular, as broad as high; but in the depressed forms the aperture is broader than high, obliquely subangulate. The lip is simple, thickened, its terminations joined by a heavy callus,—the thickening of the lip and callus is a shade darker than the body of the shell.

Height of the largest specimen 1 inch, breadth 1⅛ inch.

Habitat, Rathdrum, Idaho.

The above varieties represent a colony of the largest specimens of the Strigosa group that I have collected. They are an important and very interesting addition to the series, and serve to confirm my previous views on the relationship of what I call the Strigosa group. This colony inhabits open places in the dense pine forests of the mountains, overgrown with deciduous bushes. They hibernate among leaves, brush and roots of trees and in protected and secure places, generally on the north slopes of the mountains.

(4.) **Patula strigosa** Gld. var. **jugalis.**

Shell umbilicated, depressed with numerous prominent oblique striæ; spire very moderately elevated or depressed; whorls 5½ somewhat flattened above, but more convex beneath, the last falling in front, with two dark revolving bands, one at the periphery and the other above; the body whorl subcarinated at its beginning but more rounded as it approaches the aperture; suture well impressed; color ashy white with occasional horn colored stains; umbilicus large, pervious, showing the volutions; aperture oblique, ovate, but in very depressed specimens the aperture is at right angles with the axis of the shell; lip simple, thickened, its terminations approaching and joined by a thick heavy callus, making the lip in very adult specimens continuous.

Height of the largest specimens ½ inch, breadth 1 inch.

Height of the smallest specimens $\frac{6}{16}$ inch, breadth $\frac{11}{16}$ inch.

Habitat, Banks of Salmon River, Idaho.

This is another interesting form of the very variable strigosa. It inhabits stone piles, and other places where it can find shelter and protection against the fatal rays of the summer's sun, close along the banks of the river. It is interesting on account of its very depressed form and the ovate form of the aperture, the heavy callus, joining or "yoking" together the extremities of the lip.

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